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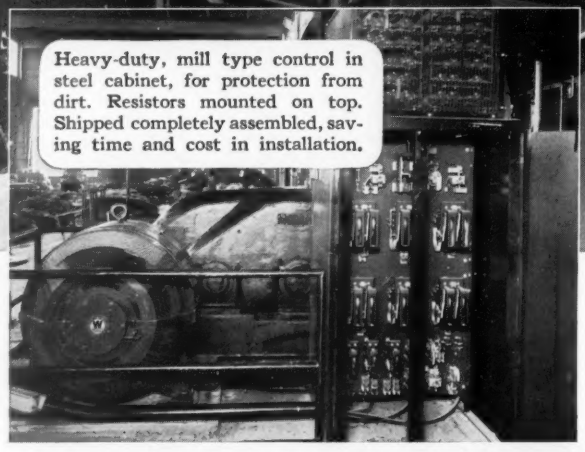

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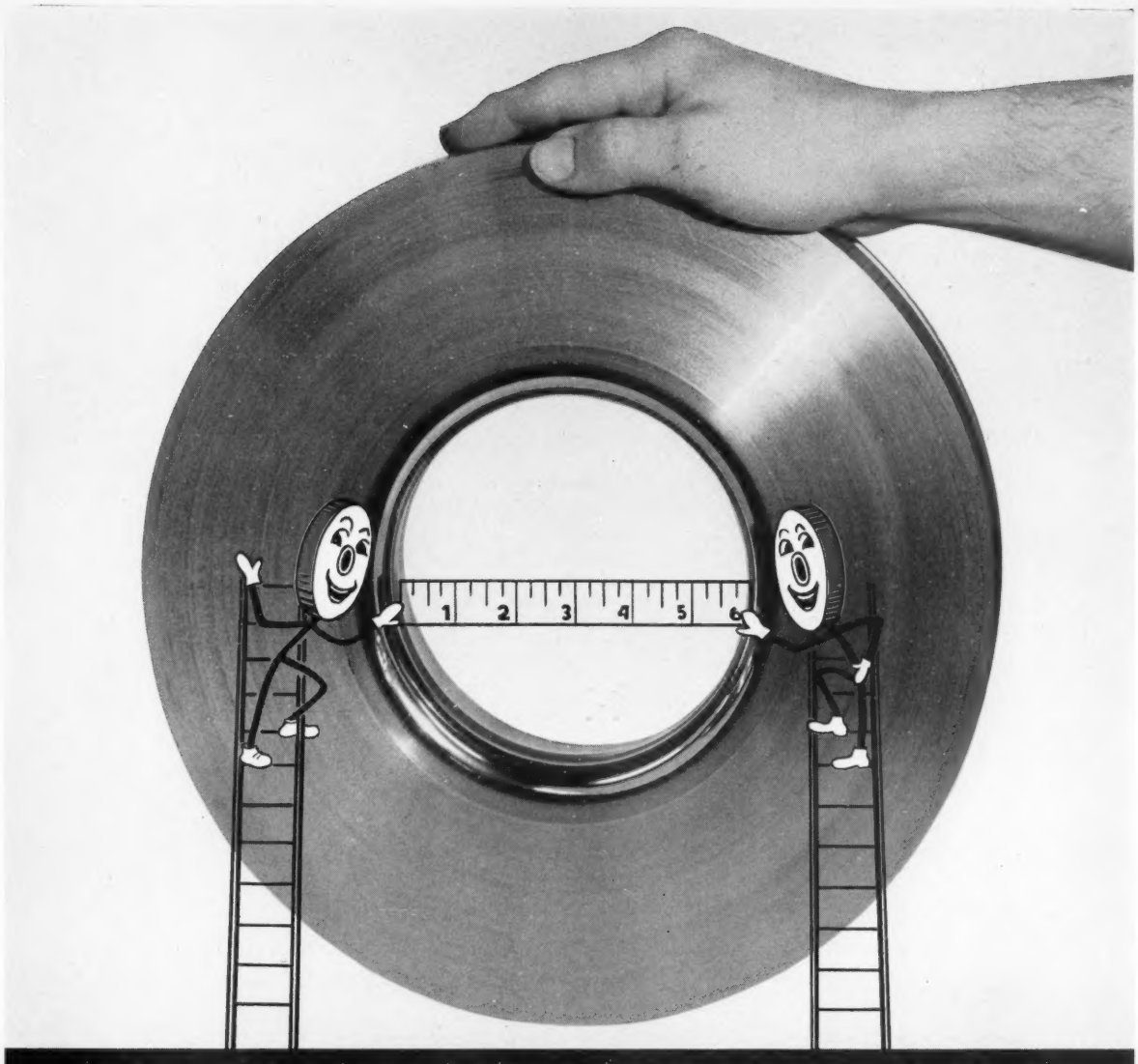

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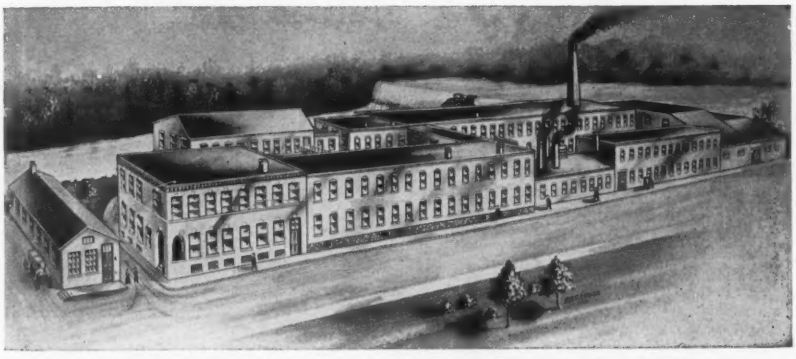

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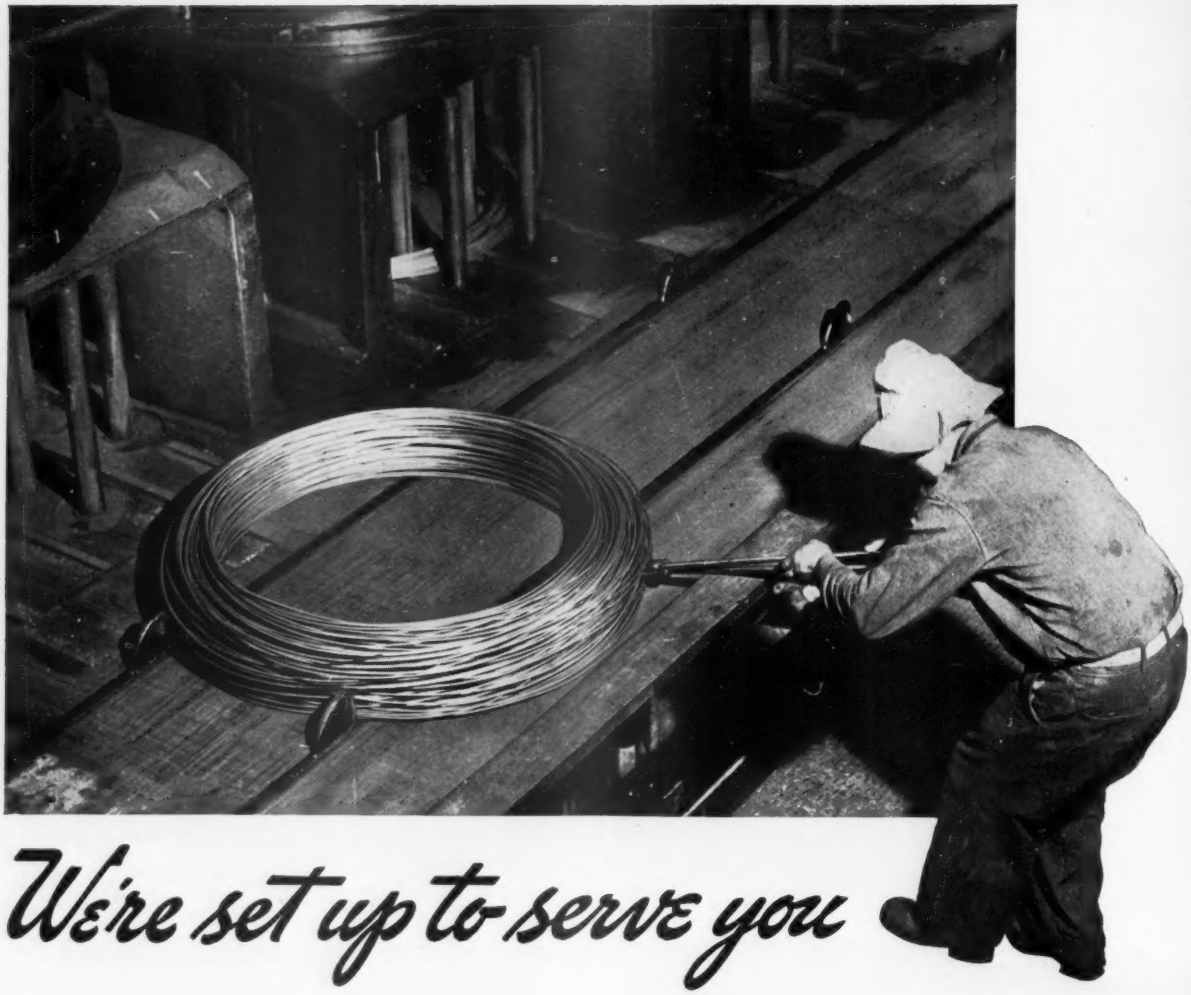

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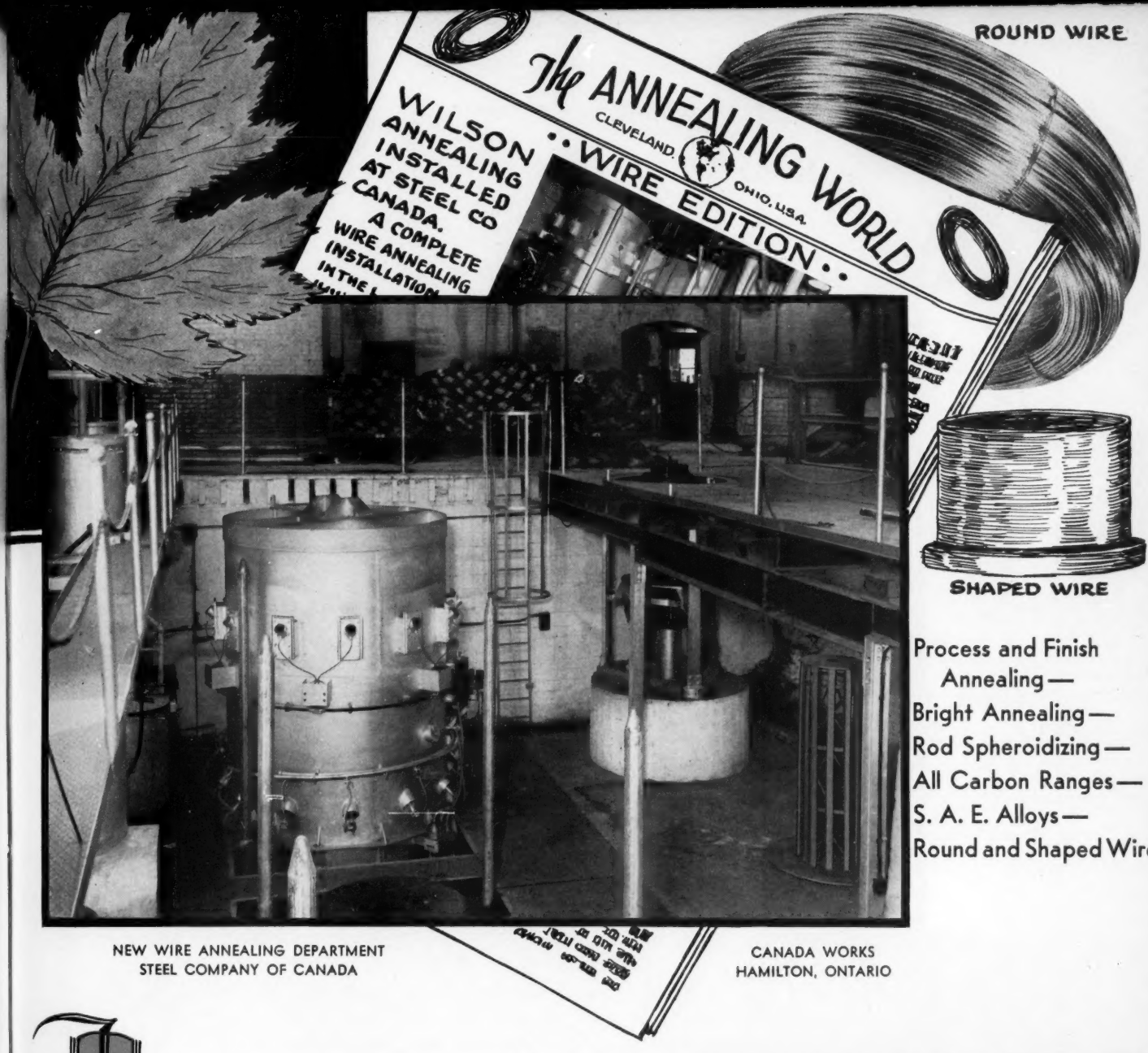

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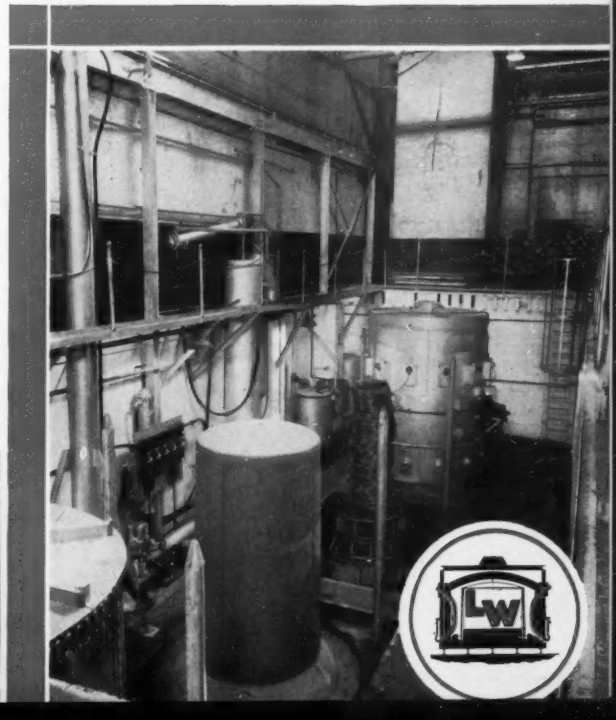

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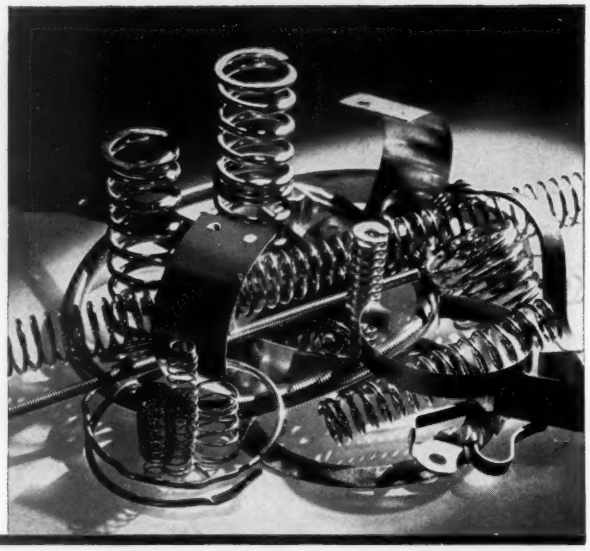

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DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 14 JULY, 1939 No. 7

Designated as

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Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 14 JULY, 1939 No. 7

A Further Discussion of Reactive Wire Drawing

By H. A. Stringfellow,
New York, N. Y.

Additional research on this subject is now presented. Further discussion and criticism will be welcomed as this subject is exceedingly interesting and any discussion, far from being academic, may well lead to distinct commercial improvements in the art of drawing wire. ✦ ✦ ✦ ✦ ✦ ✦

IT appears, from the comments which were published with the article on the theory of **reactive wire drawing** in the May issue of WIRE & WIRE PRODUCTS, that certain ideas were possibly not expressed as clearly as they should have been and the following is presented in an attempt to clarify those points which have been brought up in discussion and to, perhaps, advance some new ones.

✦ ✦ ✦

EXCEPTION has been taken to the statement made in the first paragraph of the article to the effect that the usual concept of back-pull wire drawing appears to be fallacious. In considering this statement, it is necessary to separate the mechanics from the metallurgy of the problem.

✦ ✦ ✦

CONSIDERING the mechanical aspects alone; a wire under tension is drawn through a die, the tension on the wire, exclusive of that produced by the die, being secured in any convenient manner; by dead weight load if desired. Under such conditions the die pressure is reduced and at first glance it would appear that this pressure would decrease in direct proportion as the back tension was increased. This is the concept which has been commonly maintained. In other words, the back-pull curve was considered to be a straight line.

✦ ✦ ✦

THIS however, has been found not to be the case. By taking readings with a dynamometer die holder and applying different amounts of back tension, all other conditions of drawing remaining the same (material, reduction and speed), if these readings are plotted on co-ordinate paper a rather irregular curve results, as shown in Fig. 1, which however, can be smoothed into the general form shown by the regular curve in Fig. 1. Some of the irregularities in the broken curve might be chargeable to errors in reading instruments, but they all certainly cannot be so charged, especially as there appears to be a regularity even in the irregularities and these irregularities appear to repeat in all experiments.

✦ ✦ ✦

CONSIDERING the smooth curve, which may be called the theoretical curve, there are three well defined breaks, and it is probable that if the load on the wire were further increased this curve would break again and flatten out still more. It is therefore evident that as the number of increments of back pull increase, the reduction in die pressure, per increment, decreases. For example, when a back pull equal to 12½% of the conventional die load is applied, the die load is reduced 12½%. So far the usual concept applies, as die pressure is reduced pound for pound as the back pull is increased.

If however, a back pull equivalent to 37½% of the conventional die load is applied the die pressure is reduced only 28¾%. Similarly, when a back pull equal to the conventional die pressure is applied, the die pressure is reduced 60%.

✦ ✦ ✦

CONSIDERING the irregular curve plotted in Fig. 1, the irregularities may be charged either to errors in reading, non-uniformity of material, or changes in the material produced by cold work.

✦ ✦ ✦

AS stated before, it is not reasonable to charge all of these irregularities to errors in observation because of their apparent repetitive nature. When recourse is had to the two remaining possible reasons, non-uniformity of material or changes produced by cold work, these are found to be corollary to each other and to bring in the metallurgy of the problem. It is hardly possible that variations in the quality of the material experimented upon, although undoubtedly extant, could be so marked as to be solely responsible for these irregularities. The changes produced by cold work appear, therefore, to be the most logical factor to be considered.

✦ ✦ ✦

IN the consideration of cold work reference is had to an article by **R. L. Templin,** published in Bulletin No. 238 of the **American Institute of Mining & Metallurgical Engineers.** In this article it is pointed out that the rate of strain hardening is not always uniform and varies with the material and the extent to which the cold working is carried; when there is an increase in the rate of strain hardening it appears that most of the available crystal slip planes have been utilized and that there is a preferred orientation of grains set up throughout the material.

✦ ✦ ✦

DRAWING under back pull appears to make available more crystal slip planes, as brought out in the previous article, and if this is true it would appear that changes in the percentage back tension should produce corresponding, but not necessarily equal, changes in the availability of such planes. It would therefore appear that the rate of strain hardening is different with different percentages of back pull; in which event the back pull curve cannot be a straight line as it is affected by the changes in this rate.

✦ ✦ ✦

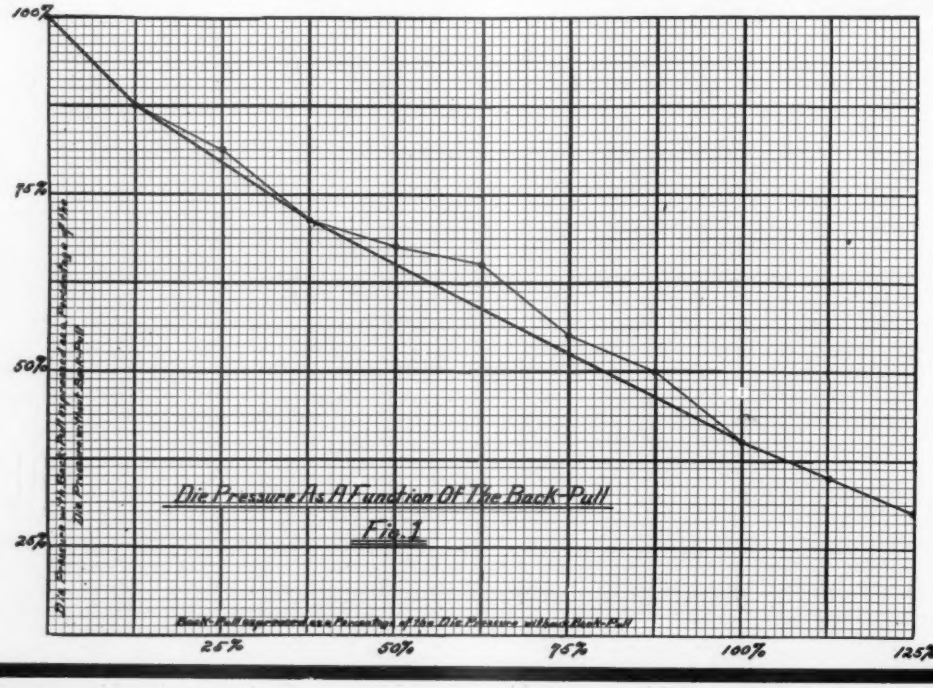
THIS appears to be borne out to some extent by the fact that experiments have shown that the ultimate tensile strength of certain wires drawn under back pull is somewhat less than that of the same wires drawn by conventional methods. This would appear to indicate that more crystal slip planes have been made available for reduction and that the preferred orientation of grains has not been completely set up in the material.

✦ ✦ ✦

THE critical attitude towards the description of the stresses existing during reactive drawing is well taken, and especially so, since the correct ultimate result (H = D + R) is expressed in the criticism. In the previous article it should have been stated that the construction of a wire drawing head for use in reactive drawing is such that the back tension R is developed by the pulling force, H and is automatically maintained at a fixed percentage of this pulling force; this percentage is adjustable for the work which the machine is to perform.

✦ ✦ ✦

WITH the above in mind, reference is had to Fig. 2 which shows the stress conditions existing when the system is in a static condition. No stress exists except the back pull stress R. Actually the two principal stresses, R and D, are developed simultaneously by the mechanism of the machine; it is however entirely proper, for purposes of explanation to con-



Die Pressure As A Function Of The Back-Pull

Fig. 1

sider that the stress R exists prior to the development of the stress D. It is also much more logical to consider H as the fixed point because wire can be stressed backward through the die from H to R, for its full machine length, while any stress developed by H can act only between H and D; that portion of the wire between D and R remaining unstressed.

✦ ✦ ✦

FIG. 3 and the diagram Fig. 4 show the stress conditions existing when the system is in motion and drawing wire. Fig. 3 shows the loads to be overcome, which may be considered as instantaneous values existing just at the instant motion starts. It would be incorrect to assign a direction of action to these stresses, were it not for the interposition of the die between H and R; the die determines the direction of stress as from H to R. Because of the construction of the drawing head, the retarding block R reacts against the pull of the drawing block H, this reaction being always a fixed percentage of the pull exerted by H; any change in the value of this pull is immediately reflected in the resistance developed by the block R.

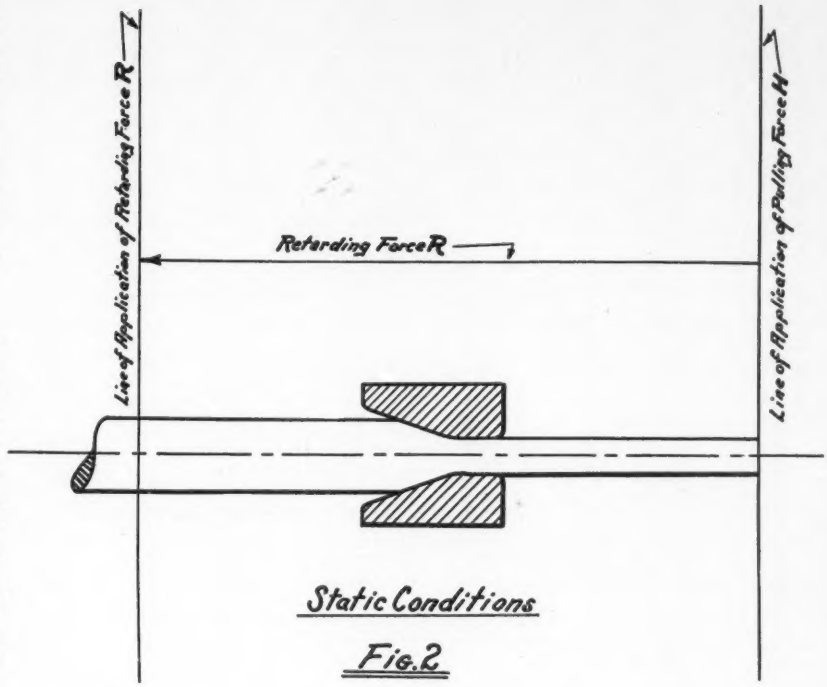
✦ ✦ ✦

THE diagram Fig. 4, shows the actual proportional values of the principal stresses existing, during reactive drawing, for a particular set of conditions. The conventional pulling force is equal to the conventional die pressure and this is the scale by which the reactive diagram is to be read. It will be noted that with a retarding force R equal to 80% of the conventional die pressure, the reactive die pressure is 50% of the conventional pressure and the total pulling force is 130% of the conventional pulling force. Any change in the pull developed by H is immediately reflected in the resistance of the head R, as shown above.

✦ ✦ ✦

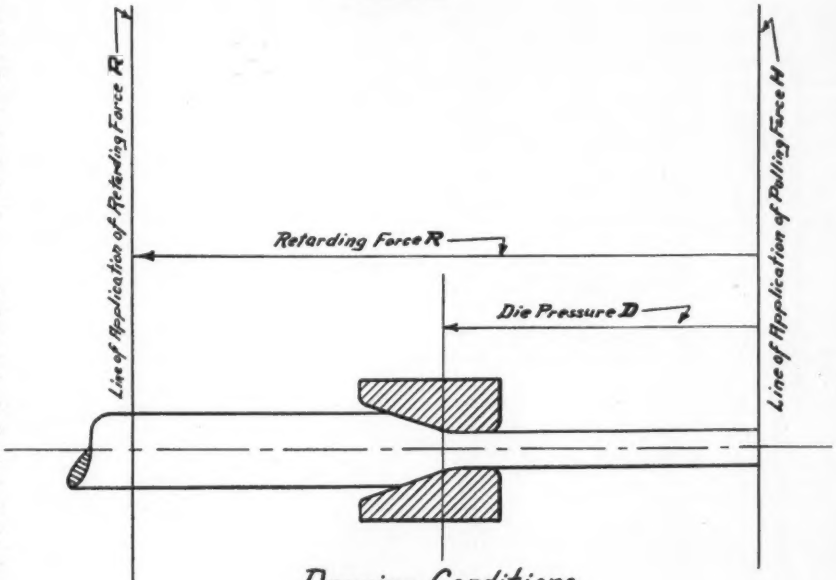
NO change in the pull developed by H can occur unless there is a change in the die pressure D, because R and H will always maintain the balance to which they have

(*Please turn to Page 395*)



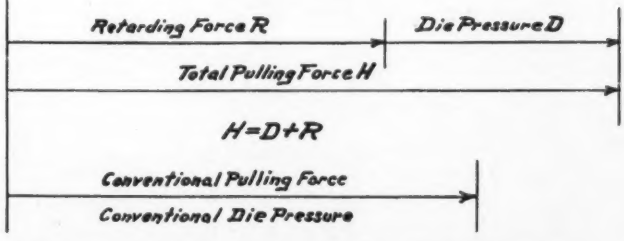
Static Conditions

Fig. 2



Drawing Conditions

Fig. 3



Proportional Values of Principal Stresses

Fig. 4

Canadian Wire Mill Modernizes Its Annealing Department

By L. D. Seymour,
Assistant Works Manager, Canada Works, The Steel Company of Canada, Ltd.,
Hamilton, Ont.

A description of the new annealing department recently installed at the Canada Works of the Steel Company of Canada, Ltd., Hamilton, Ontario.

IN keeping with the policy, formulated by the local and general management, of having the most modern facilities for the production and processing of rod and wire of all carbon ranges, the Steel Company of Canada has recently completed the installation of a complete new annealing department in their Canada Works at Hamilton, Ontario.

✦ ✦ ✦

HAVING in mind the necessity of providing for the most diverse type of material specifications, a point of more immediate consideration in a Canadian mill than in a mill in the United States, the installation was basically designed to allow for variation in temperature and atmosphere treatment so that any order could be processed without waiting for an accumulation of the same type or size of material. The size of the mill is such, however, that this diversification was not considered in the light of several hundred pound lots but so that the minimum charge was several thousand pounds of rod or wire.

✦ ✦ ✦

TO accomplish this program, the management, metallurgical and engineering staffs, after an exhaustive investigation of all available annealing equipment, made the decision to install a cylindrical bell type furnace with four bases and a deoxidizing gas generating and treating plant to provide atmosphere for low, medium, and high carbon steels and alloys. Coke oven gas being available, the fuel costs were favorable, and a radiant tube type furnace, as designed and built by the Lee Wilson Engineering Company at Cleveland, Ohio, was purchased.

FORTUNATELY, the particular plant layout allowed the use of the existing crane and, by the removal of the old annealing pot settings, space was provided at the basement level so that there was sufficient clearance from there to the crane hook to allow for the transfer of the bell from base to base.

✦ ✦ ✦

L. D. SEYMOUR

Born August 12, 1902, Hornell, New York. Received B.S. in Metallurgy, Pennsylvania State College, 1926. Until 1929 employed in the Physical Laboratory of American Steel and Wire Company, Worcester, Mass. Two years as Metallurgist with Reed & Prince Manufacturing Company. Four years with Jones & Laughlin Steel Corporation as Wire Metallurgist in their Aliquippa, Pa. plant. Became associated with the Youngstown Sheet & Tube Company early in 1934. In July 1938 became associated with the Steel Company of Canada, Ltd., Hamilton, Ont. Member of the Wire Association.

FIGURE No. 1 is a photograph of the installation as viewed from the top of the annealing building. The four bases are installed on 18 in. piers above the basement floor level and sit in line on 12'9" centers. The pit provides sufficient room for placing the inner covers during furnace charges. On a ledge, to one side of the pit, the gas generating apparatus is placed.

✦ ✦ ✦

IT is to be noted that the entire installation is planned to allow for free movement of the wire or rod coils to loader, from there to the bases, and, when stripped, to be removed on buggies for further drawing or shipment.

✦ ✦ ✦

IN these furnaces all sizes of coils are handled, from rods to 8 in. block wire, and all treatments, from process anneal to spheroidization, are accomplished, without producing scale, and without affecting the surface condition detrimentally. The wire can be brought out of the furnace as bright as or brighter than it went in, and a tremendous saving in cleaning costs are already being made for both round and shaped wire coils.

✦ ✦ ✦

FOR all flat wire, cleaning after annealing has been eliminated. For drawing soft coppered wire, the wire is taken direct to the coppering bath without cleaning. On continuous machines #16 gauge bright annealed stitching wire has been drawn to #22 gauge without cleaning, and tinning of annealed wire has been done without cleaning. Process annealed wire, bright annealed, can be drawn further without cleaning. Emphasis is placed on drawing the wire

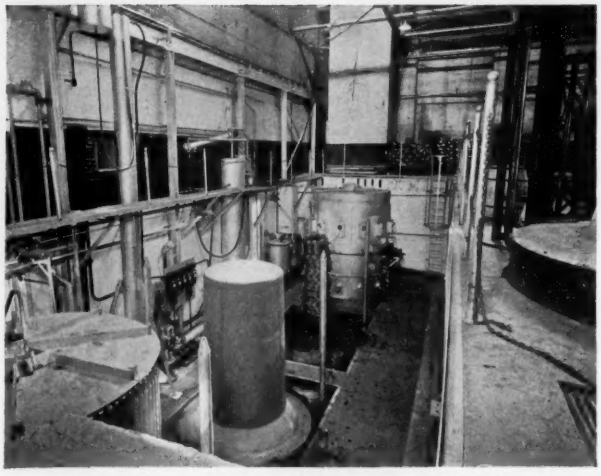


Fig. 1.

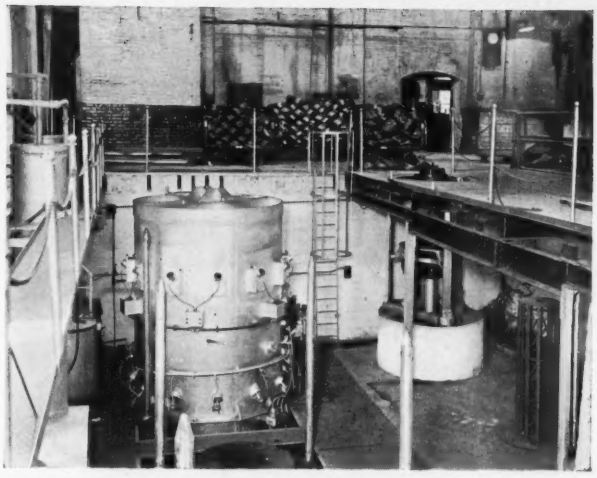


Fig. 2.

clean before annealing as otherwise an extra heavy coating of drawing compound will leave a carbonaceous smut which may have to be removed by cleaning for some purposes.

✦ ✦ ✦

FIGURE No. 2 is another view of the installation and shows a closer view of the furnace unit. This unit is fired by vertical radiant tubes spaced uniformly around the inside of the bell. Since none of the products of combustion get into the furnace and all heat is radiantly applied, the furnace lining is largely insulation. The tubes, of course, are high temperature alloy. The total weight of the bell is slightly over 5 tons for a charging base of 48 in. in diameter and a charge height of 84 in. (7 ft.)

THE furnace is operated with complete temperature control to regulate from either tube temperature or charge temperature. The controlling instrument has three records so that the bottom of the charge can also be recorded to show when complete saturation has been accomplished.

✦ ✦ ✦

EACH of the four bases has its own recirculating fan. These fans are driven at high speed and move the gases under the inner covers at velocities of well over one thousand feet per minute. The bases are provided for liquid sealing, oil being used in the seals so that the higher carbon charges cannot possibly be exposed to the slightest addition of moisture. Fan motors are directly connected to the fan shaft and are of the air-cooled type.

THE inner covers are of 25-12 alloy and are made of No. 14 gauge material to accelerate the cooling portion of the cycle.

✦ ✦ ✦

THE coil loading and stripping machine, shown in Fig. 2, right center, previously mentioned, is a unique device to allow placing the coils on the spiders or stems without dropping them and removing the coils without having to upend the spiders and dump them on the floor as has been the usual practice in the past in wire mills. The unit is an elevator, driven by three square cut thread conveyors, which lifts or lowers a plate which fits over the flange on the bottom of the spiders. The spider is anchored in position and is stationary for either loading or unloading. The spiders are of spe-

(*Please turn to Page 398*)

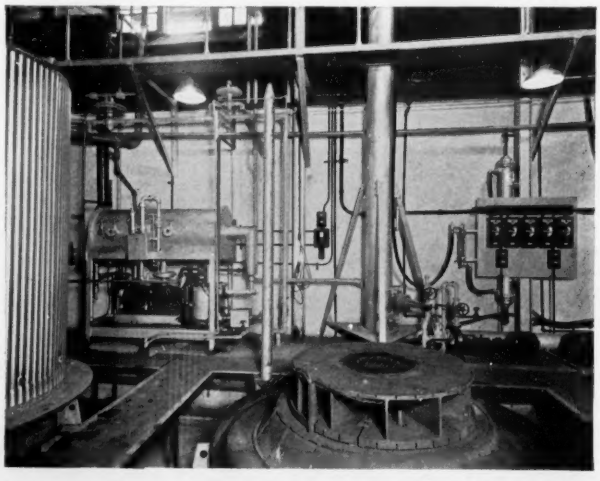


Fig. 3.

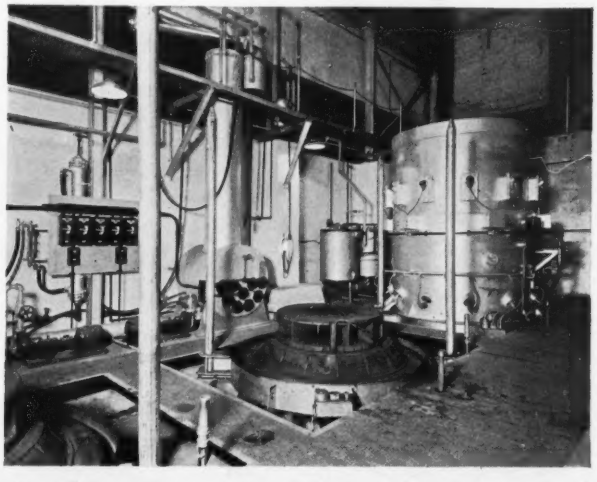


Fig. 4.

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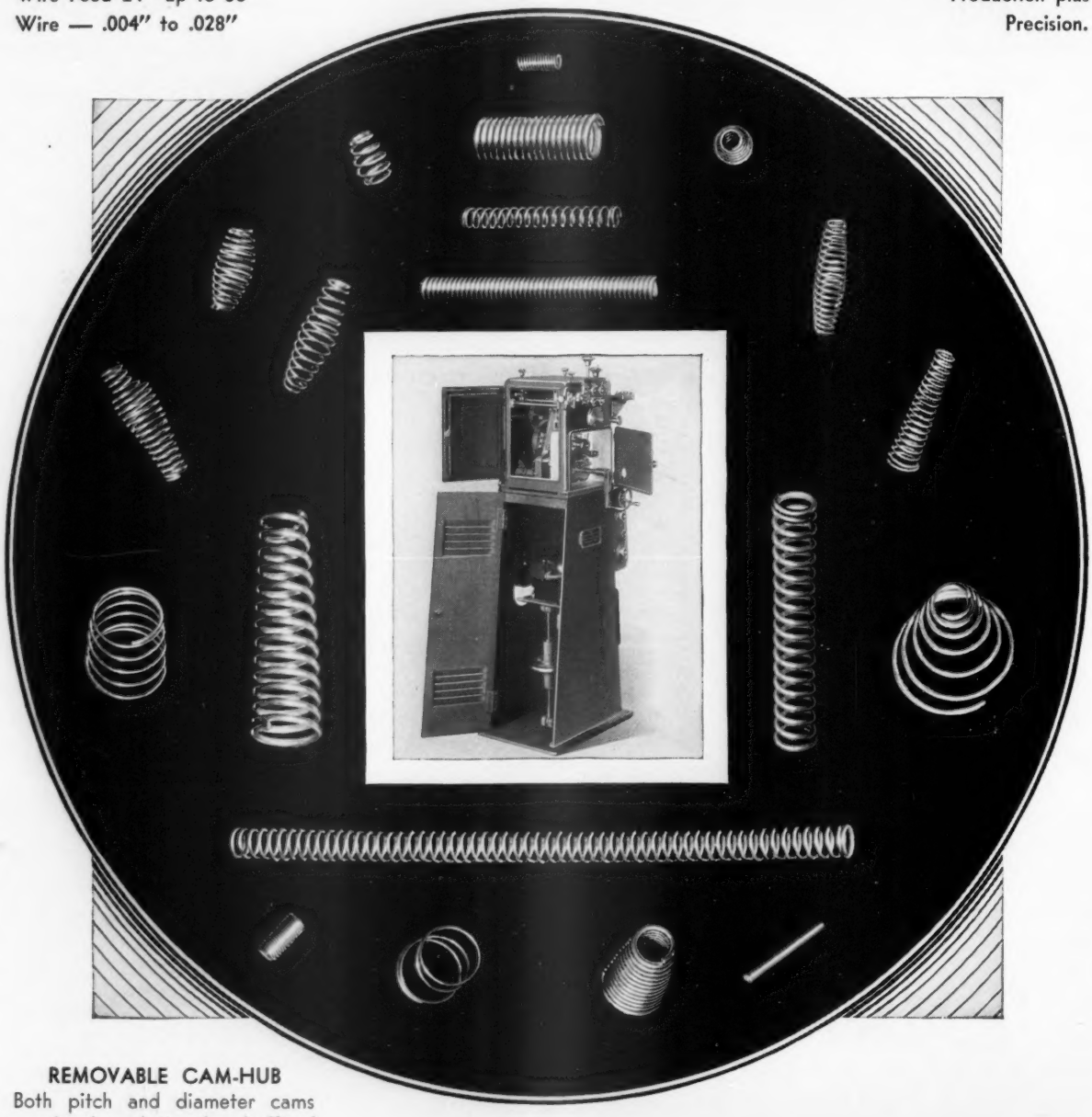

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Cost Control of Non-Productive Labor

By T. W. Fazakerley, A.I.I.A.

West Wickham, Kent, England

Introductory

IN any productive section of a Wire and Wire Product factory it is necessary for a close control to be exercised on the expenditure of wages on non-productive work. The variation of productive wages should be in direct proportion to the volume of output, and this is particularly necessary when productive wages are paid on a Piece basis. Non-productive wages are found, usually, to remain fairly constant regardless of the actual volume of output, and consequently the lower the output the greater becomes the non-productive labor cost per unit.

✦ ✦ ✦

WITH this knowledge in mind it will be appreciated that some definite method of control is necessary in this direction.

✦ ✦ ✦

Defining Non-Productive Wages

IN the first place it is necessary to define Non-Productive Wages, and these in the ordinary way can be described as wages expended for necessary work not directly connected with production. Under this heading such items as the following would be grouped:—

1. Supervision.
2. Idle Time Allowance.
3. Servicing.
4. Clerical Work.
5. Sweeping and Cleaning.
6. Errands.

It is appreciated, of course, that individual factories will have their own particular list of non-productive wages.

THE most satisfactory method of controlling Non-productive Wages has been found to be that of issuing a weekly Non-productive Wage Report, as shown in figure 1. A study of this form will reveal that the method of control is that of comparison of actual non-productive wages as a percentage of productive wages.

✦ ✦ ✦

BEFORE the system of control such as here described, is introduced into the factory, it is necessary to set an agreed standard. If it is decided that the non-productive wages in a certain department must not exceed, say, 10% of the productive wages, then if the non-productive wages for a week are found to exceed this percentage, the difference represents an actual loss. Conversely of course, if the non-productive wages are less than 10% of the productive wages, the difference in this case represents a profit. It will be seen that on the form under discussion a provision is made for comparing the proportion of non-productive to productive wages, and that also any productive wages can be controlled and can be subdivided at the same time into Wages Paid on Time Work and Wages Paid on Piece Work.

✦ ✦ ✦

IN Wire factories and allied industries the fact is generally accepted today that operatives employed on Time work will give approximately 20% greater output when transferred to a Piece basis. This increase is entirely due to the fact that a Piece basis provides a degree of inducement or incentive not to be found on a Time basis. For this reason then it is very desirable that as much labor as possible, whether productive or non-productive, should be employed on a piece rate basis, to ensure that there is a maximum rate of operative efficiency throughout the entire department.

(*Please turn to Page 387*)

NON-PRODUCTIVE WAGE REPORT

NON-PRODUCTIVE WAGES	PRODUCTIVE WAGES
Supervision.	TIME
Idle Time Allowance.	
Servicing.	PIECE
Clerical Work.	
Sweeping & Cleaning.	
Errands.	

% NON-PRODUCTIVE TO PRODUCTIVE
% STANDARD ALLOWANCE

WEEKLY { LOSS: / PROFIT:

PROGRESSIVE { LOSS: / PROFIT:

*The Application of Electric Heat To Wire

By W. P. Cook,
Ohio Edison Co.

The solution of a heating problem in connection with the tinning of fine wire. ✦ ✦

THE question of electric heating in a large number of cases looks relatively simple, but after getting into the problem it is often found that there are numerous items which are never thought of, or are looked at as of minor importance, which would never cause any trouble.

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IN the majority of cases a small installation, of practically no importance often leads on to larger jobs of vast importance.

✦ ✦ ✦

IN this particular plant, on the original call, we were called in to give our recommendations on a wire drawing machine where their die life was very short. We found that the wire being drawn was shipped a considerable distance and drew moisture, as well as having on a hard coating of lime, which is put on during the initial draw in another plant.

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WE recommended that they heat this wire to a couple hundred degrees previous to redrawing it. We designed a small bell type furnace of approximately 10 KW, built up from strip heaters and sheet steel, which was lowered over the steel carts on which the wire was hauled. The wire was left in this furnace for about an hour and a half and it was found that after this treatment, the die life was increased 400 to 500 per cent.

✦ ✦ ✦

THIS customer was so pleased with this installation that they asked us to try and shut down an oil burning furnace in their plant. This boiler supplied steam for heating water used in process and made temperatures in the plant unbearable during the summer months.

*A Paper Submitted in the General Electric Company Industrial Heating Contest for Electric Company Power Salesmen.

THE particular problem given to us was to heat a wooden vessel of water approximately 16″ x 26″ x 10″ up to approximately 160° for the purpose of washing a number of wires passing over it. This process is in the tinning of small wire.

✦ ✦ ✦

FROM 14 to 16 wires, varying on each of 3 units, spaced about 1″ apart on a horizontal plane are unreeled off of spools and go through the following process, ending up by being rereeled on spools about 100′ from the initial starting point:

1—Pass through molten lead bath,
2—through cold water,
3—through a 20% muriatic acid solution,
4—through another cold water bath,
5—through another 20% muriatic acid solution,
6—through cold water,
7—through a very mild copper sulphate bath with metallic tin,
8—through warm water, which was to be heated electrically,
9—through carborundum granules heated to 1200° to remove all water,
10—to rereeling machine.

✦ ✦ ✦

LOOKING into the question of heating this tank of water, which would contain about 18 gallons, we figured that the majority of the muriatic acid would be taken off through the previous cold water bath and through the copper sulphate bath. In fact a sample of water was taken and an analysis made of it by the local University, who stated that acid content was so small that they could not determine the exact amount with their limited facilities. A brass air pipe and an iron steam pipe both in the bath showed no signs of corrosion which would indicate no acid action.

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DUE to these findings, we applied 9 KW in two units of 4 and 5 KW respectively. This capacity was required due to the fact that considerable water is spilled out of the vessel by agitation as explained below. These units were of the goose neck type, stainless steel sheath inasumch as the tank was wooden and water spilled over the edges so that they could not be installed through the side of the tank. Inasmuch as the wires run over the tank and do not dip down into the water, it was necessary to install a compressed air pipe in the bottom of the tank which would bubble the water over the wires and produce a washing effect.

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THREE tanks on three separate machines were equipped with this layout and operated very satisfactorily for a period of about five months.

✦ ✦ ✦

AT the end of five months one of the units was found to be out of service and after removing the same we found that it was very badly pitted and the sheath had eaten through in a number of places, which of course, put the unit out of service. After finding that this one unit was in bad shape, all the other units were removed and it was found that all of them were getting in the same condition. We were at a loss to determine exactly why these units had been eaten up, due to the fact that we had taken extra special precaution before installing them to determine the acid content of the bath. Further samples of the bath water were sent to the manufacturer of the heating elements and they again determined that the acid content was so slight that there should be no action. Further help was asked from the manufacturers of the metal and it was finally determined that the air introduced into the bath for the pur-

pose of agitating the water had made the minute acid content very active and in this way damaging the sheath of the units. Due to activity of the acid combined with the oxygen, it was determined that no other sheath, other than lead might be considered. Accordingly we obtained a lead sheath unit and installed it in one of the tanks in order to determine if it would stand up under this service. After about three weeks' test, the lead sheath unit was removed and microscopic examination showed that it too was being attacked by the solution.

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THIS left us in quite a quandary as to how to take care of heating this water. Conditions were such that we considered a steam generator, but the cost of three units would be prohibitive and the load would be entirely lost. Accordingly we sat down and did a little figuring and determined that we could have a small boiler made up for a relatively small cost. Into this we could install 2—5 KW units which would generate low pressure steam. The boiler was equipped with a solenoid valve water level control which keeps the water maintained at a constant level. From the top of the boiler a one inch pipe was run into the wooden tank through brass pipe into the bottom of the bath water container. The tank was insulated and the total cost of each unit did not exceed $125.00.

✦ ✦ ✦

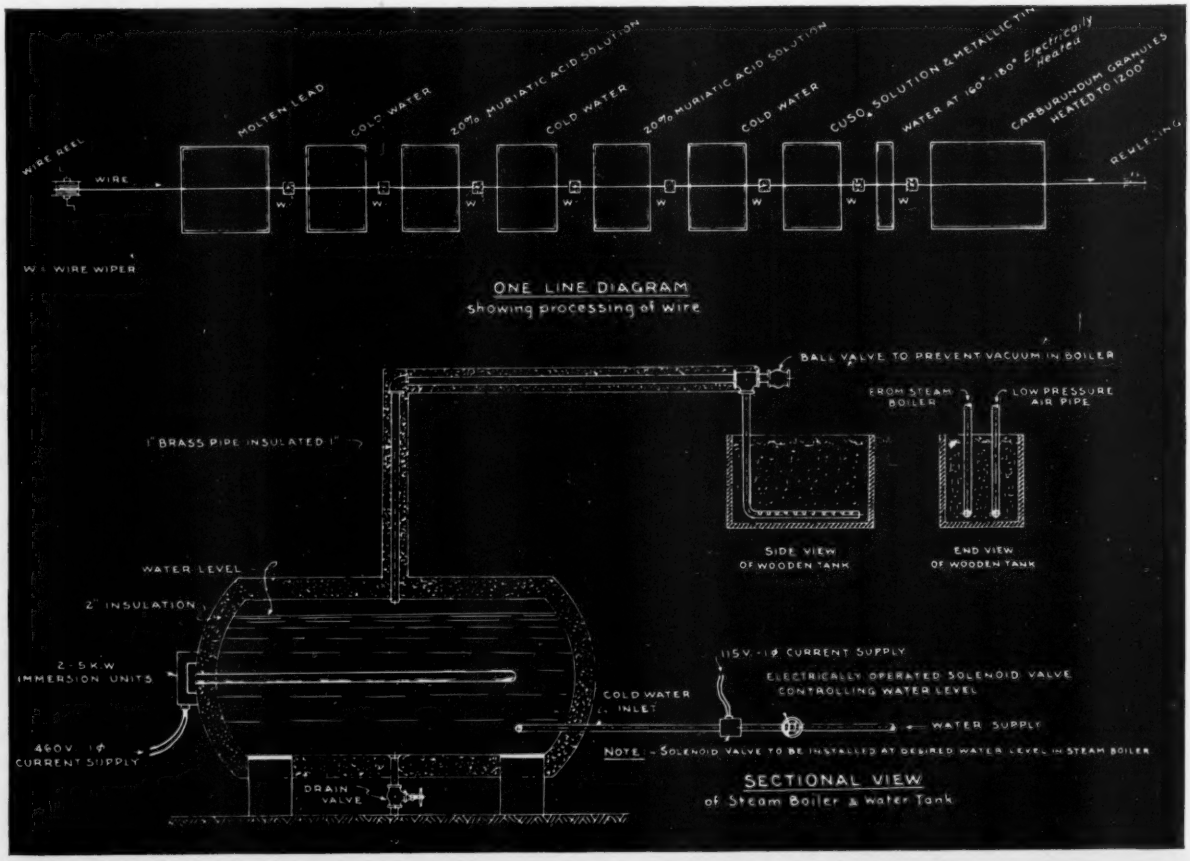
THIS boiler is generating steam at approximately atmospheric pressure, inasmuch as the head of water in the tank is not more than ten inches, so that it is not necessary to have a pressure control. This tank was left in operation for one month's period and proved so satisfactory that the same type of unit was put on two other machines and they have been operating for considerable length of time and giving 100% service.

✦ ✦ ✦

OPERATING costs for this equipment on a 1½c per KWH rate are not more than 50% of the oil costs when operating an oil-fired steam boiler. The original intention was to shut the oil-fired boiler down in the summer time only, inasmuch as it was required for heating during the winter. Results have been such that the company figures on operating the equipment electrically throughout the year. Not only have operating costs been cut down but the plant is no longer hot and oppressive for the workers.

✦ ✦ ✦

IN this particular case we were practically licked and had practically decided to give this up as a bad job. However, the new application has proven so satisfactory that the company is now seriously considering the installation of electric heating on their three lead pots, as well as the installation of electric heating on three tempering and drying ovens. This, no doubt, will mean the installation of at least 200 KW in electric heating.



Bethlehem Installs New Wire Cleaning And Baking Unit at Maryland Plant

A NEW cleaning and baking line has recently been completed at Bethlehem Steel Company's wire mills at Sparrows Point, Md., to take care of the increased production resulting from the addition of a continuous rod mill and a number of new drawing machines. The new unit consists of two pickling tanks, a wash tank, a high pressure spray tank, 3 lime tanks, a sulling rack, and three flash bakers, with the necessary crane and conveyor equipment to permit a continuous flow of materials through the unit.

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ROD bundles from the two continuous mills or from the storage bins are delivered by overhead tramway to an intermittently operated chain conveyor at the head of the cleaning line, and running at a 90 deg. angle to the line. At the end of the conveyor the loads of rod bundles are picked up, as needed, by a 3-ton revolving trolley crane, equipped with hairpin hooks of acid resistant alloy. The crane has a span of 21 ft. 6 in., a traveling speed of 450 ft. per min., and a hoisting speed of 50 ft. per min. It is capable of turning 90 deg. in each direction, a total of 180 deg., at a speed of 2 r.p.m. A 28-hp. motor operates the bridge, a 15 hp. motor the hoist, and a 5 hp. motor the turntable.

AS the crane operator picks up a load of rod bundles from the chain conveyor, another load is deposited at the opposite end, and the conveyor is moved forward one step. The conveyor has push button control and can be operated both from the crane cab and from the tram rail terminal.

✦ ✦ ✦

THE pin with the rod bundles is first deposited in one of two pickling tanks. These are 20 ft. 10 in. long, 8 ft. 6 in. wide, 6 ft. 9 in. deep, and are heated with steam, with automatic temperature control. They are made of steel, painted inside and outside with asphalt composition, and lined with hard burned brick, set in acid proof cement. Both tanks are equipped with two rocker agitators, each with two yokes for supporting the pins with rod bundles, which are suspended crosswise in the tanks. Each agitator is activated by a 10 hp. motor and operates at 15 strokes per minute, giving the rod bundles an up-and-down motion in the pickling bath. Racks placed at the bottom of the tanks stop the bundles 4 in. before the end of the stroke is reached. As the coils touch the racks they are raised from the supporting pin. At the same time they spread out at the top, allowing the solution to penetrate completely to every part of the bundle, including the points of contact between rods and pin. Thus the entire surface of the rod is exposed to the action of the acid. The up-and-down movement also increases the pickling action.

✦ ✦ ✦

AS soon as the crane operator has deposited a load of bundles in an empty yoke, he picks up the load of bundles which has been the longest period in the pickling tank and carries it over to the wash tank, which is 10 ft. long, 8 ft. 6 in. wide and 7 ft. deep. It is made of fir, lined with white oak and is divided into two compartments, one for running cold water, for the initial wash, and a spray compartment for water of 100 lbs. pressure, applied through three sets of nozzles, one set on each side, and one at the end, for spraying the bundles on the inside.

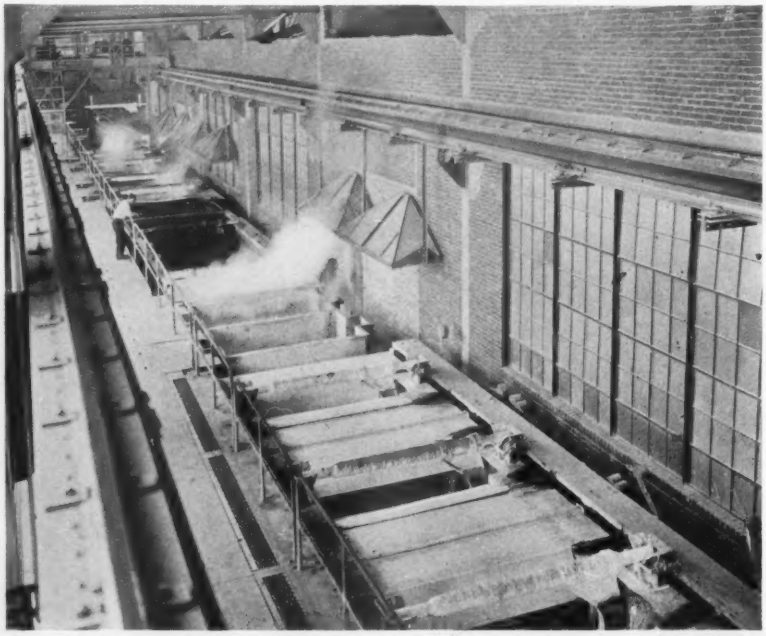

Fig. 1. Cleaning and baking division, wire mill, Sparrow Point plant. Flash Bakers in foreground. Washing tanks in center.

✦ ✦ ✦ ✦ ✦

THE thoroughly washed bundles are now moved to a sulling rack made of concrete and steel, 18 ft. long and 8 ft. 6 in. wide, with space for four pins, and equipped with fine water atomizers. Again the crane operator exchanges his load, picks up a bundle that has become completely coated, and carries it to the lime tanks. Three lime tanks are used, for heavy, medium, and light coatings. These are 8 ft. 6 in. wide and have a combined length of 15 ft. 6 in. Steam is injected in all tanks to maintain the proper temperature and to keep the lime in suspension. The tank used for heavy coatings is also agitated by a circulating pump.

✦ ✦ ✦

FROM the lime tanks the coils are moved to three specially designed flash bakers. These are heated by indirect firing with a mixture of blast furnace gas and coke oven gas, of 500 b.t.u. Each baker has five sets of U-shaped combustion tubes, placed, one above the other, along the walls. The pin with the rod bundles rests on a cast iron rack placed lengthwise between the legs of the tubes, and separated from them by a partition. At their upper end the legs of the tube are connected with a short piece of pipe through which part of the gas is recirculated.

✦ ✦ ✦

A FAN draws the air from the baking compartment into the chamber surrounding the combustion tubes and returns it to the baking compartment where it is blown against the ends of the bundles. One set of tubes discharges to one end, the other set to the opposite end. The circulated air is maintained at a temperature of 600 to 700 deg. F.

✦ ✦ ✦

THE baker has hinged covers which are forced downward by the weight of the bundles as they are lowered into the baking compartment. As soon as the bundles are in position on the rack the covers are pulled back into position by counter weights. This prevents the hot air from escaping from the baking compartment, although sufficient opening has been provided between the covers to permit the water vapors to get out.

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BAKING temperature is controlled automatically, by means of pyrometers, one at the discharge end of each set of tubes. These actuate valves which regulate the amount of gas going to the burners. Air-fuel ratio is set manually, and the proper flow of gas-air mixture of correct ratio is then maintained automatically through potentiometer control.

✦ ✦ ✦

AS soon as the operator has deposited the bundles in one baker, he removes a fully baked load of bundles from another baker and deposits it on a discharge conveyor similar to that used at the head of the line, but running in the opposite direction. From this conveyor the finished and inspected bundles are removed by ram truck and delivered to the wire drawing benches or to the shipping platform.

✦ ✦ ✦

THE entire cycle requires approximately 3 minutes. With two bakers and 7 racks in the pickling vats in constant use, this gives an average baking time of 6 minutes and a pickling time of 21 minutes. However, the cycle depends somewhat on the character of the

(*Please turn to Page 388*)

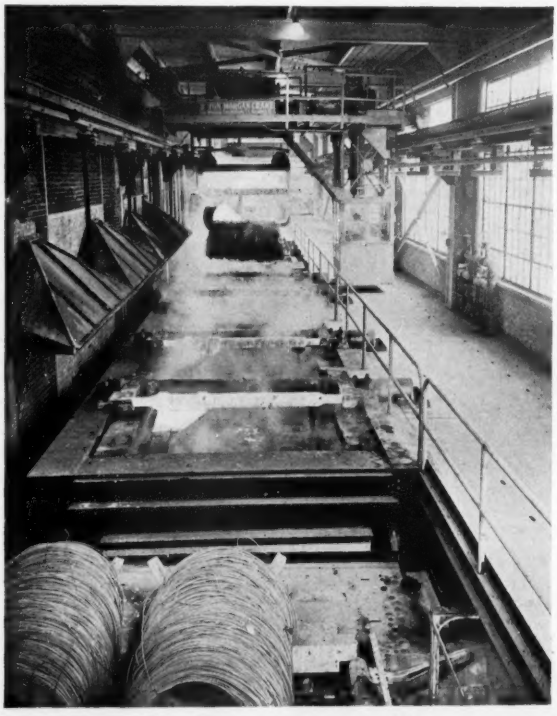

Fig. 2. Pickling tanks with rocker agitators. Chain conveyor in foreground. ✦ ✦ ✦ ✦ ✦ ✦

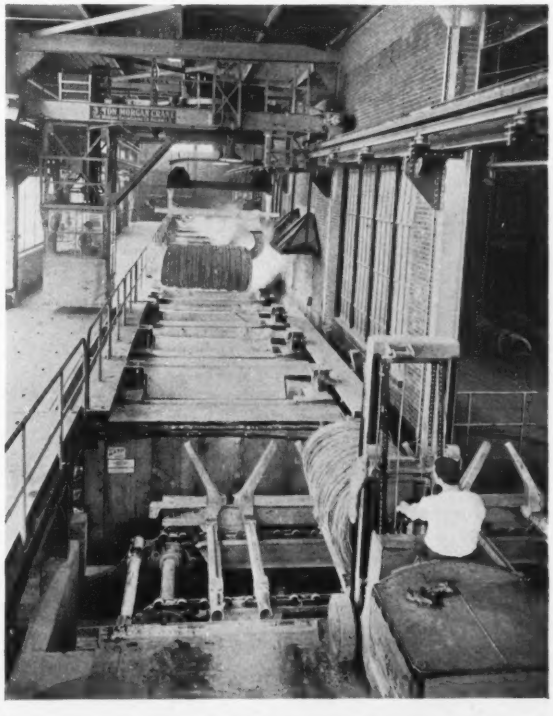

Fig. 3. End of line showing flash bakers and discharge conveyors. ✦

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Production of Steel Products — First Quarter 1939

THE report of the American Iron and Steel Institute for the first quarter of 1939, giving the capacity and production for sale of iron and steel products, is shown below.

These reports will appear at regular intervals in "WIRE & WIRE PRODUCTS" with the permission of the **American Iron and Steel Institute.**

✦ ✦ ✦

THE annual statistical report of the Institute for 1938 shows a total investment of $4,237,881,273 for the year, compared to $4,253,459,473 in 1937, with total earnings $20,109,275, or 0.47 per cent on the investment, against $260,702,665, or 6.13 per cent, earned in 1937. Combined deficit after interest charges was $14,879,461, in contrast with a net income of $228,275,738 in 1937.

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AN average of 529,364 persons was employed in December, with payrolls for 1938 amounting to $730,366,776, compared to December employment of 609,901 and annual wages and salaries of $1,118,131,014 in 1937. Average hours worked were 29.1 a week, with average earnings 91.4 cents an hour, against 37.3 hours and 87.7 cents for 1937. Stockholders at Dec. 31 totaled 519,011 and 1938 dividends were $48,951,644, against 497,738 and $149,488,147, respectively. All taxes paid were $98,606,397, including $22,601,720 Federal items, against $167,288,270 and $79,479,558, respectively, the year before.

M-2039

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

First Quarter - 1939
PERIOD

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons: Current Quarter: Total	Current Quarter: Per cent of capacity	Current Quarter: Shipments: Export	Current Quarter: Shipments: To members of the industry for conversion into further finished products	To Date: Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	29	1	xxxxxxx	618,075	xxx	18,472	392,627		xxx		
	Heavy structural shapes	8	2	4,691,800	458,920	39.1	15,791	-				xxxxxxx
	Steel piling	3	3	234,300	28,423	48.5	918	-				xxxxxxx
	Plates—Sheared and Universal	18	4	5,843,310	490,718	33.6	39,799	2,555				
	Skelp	7	5	xxxxxxx	87,885	xxx	715	66,889		xxx		
	Rails—Standard (over 60 lbs.)	4	6	3,395,300	269,761	31.8	3,478	-				xxxxxxx
	Light (60 lbs. and under)	6	7	418,500	19,599	18.7	5,310	-				xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	105,000	3,889	14.8	952	-				xxxxxxx
	Splice bar and tie plates	14	9	1,290,550	96,460	29.9	1,415	-				xxxxxxx
	Bars—Merchant	34	10	xxxxxxx	671,558	xxx	17,863	71,190		xxx		
	Concrete reinforcing—New billet	13	11	xxxxxxx	178,089	xxx	12,999	-		xxx		xxxxxxx
	Rerolling	18	12	xxxxxxx	31,311	xxx	2,665	-		xxx		xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	113,798	xxx	1,523	-		xxx		xxxxxxx
	Alloy—Hot rolled	14	14	xxxxxxx	152,515	xxx	5,663	11,950		xxx		
	Cold finished	14	15	xxxxxxx	13,574	xxx	82	-		xxx		xxxxxxx
	Hoops and baling bands	4	16	xxxxxxx	12,015	xxx	183	-		xxx		xxxxxxx
	TOTAL BARS	53	17	11,548,720	1,172,860	40.6	40,978	83,140				
	Tool steel bars (rolled and forged)	14	18	94,160	7,865	33.4	672	-				xxxxxxx
	Pipe and tube—B. W	15	19	1,728,800	166,384	38.5	6,395	-				xxxxxxx
	L. W	11	20	1,428,380	64,240	18.0	1,682	-				xxxxxxx
	Electric weld	4	21	615,000	28,963	18.8	1,150	-				xxxxxxx
	Seamless	15	22	2,994,900	298,836	39.9	16,014	-				xxxxxxx
	Conduit	6	23	153,670	13,267	34.5	448	-				xxxxxxx
	Mechanical Tubing	5	24	182,300	23,121	50.7	806	-				xxxxxxx
	Wire rods	18	25	xxxxxxx	145,012	xxx	4,499	48,019		xxx		
	Wire—Drawn	38	26	1,967,535	254,289	51.7	13,652	3,826				
	Nails and staples	17	27	1,080,760	147,304	54.5	4,872	-				xxxxxxx
	Barbed and twisted	16	28	428,075	49,747	46.5	7,845	-				xxxxxxx
	Woven wire fence	15	29	695,330	68,713	39.5	390	-				xxxxxxx
	Bale ties	11	30	110,680	8,284	29.9	21	-				xxxxxxx
	All other wire products	5	31	24,380	1,093	17.9	5	-				xxxxxxx
	Fence posts	12	32	134,700	12,623	37.5	286	-				xxxxxxx
	Black plate	12	33	462,815	80,307	69.4	1,024	29,997				
	Tin plate—Hot rolled	11	34	1,585,360	122,195	30.8	22,038	-				xxxxxxx
	Cold reduced	10	35	1,878,200	299,704	63.8	21,581	-				xxxxxxx
	Sheets—Hot rolled	24	36	xxxxxxx	869,627	xxx	53,725	29,729		xxx		
	Galvanized	16	37	xxxxxxx	275,052	xxx	20,958	-		xxx		xxxxxxx
	Cold rolled	17	38	xxxxxxx	409,856	xxx	39,533	-		xxx		xxxxxxx
	All other	15	39	xxxxxxx	99,332	xxx	4,132	-		xxx		xxxxxxx
	TOTAL SHEETS	26	40	11,015,965	1,653,867	60.1	118,348	29,729				
	Strip—Hot rolled	23	41	3,074,300	242,728	31.6	7,267	34,528				
	Cold rolled	35	42	1,095,910	124,862	45.6	2,508	-				xxxxxxx
	Wheels (car, rolled steel)	5	43	380,320	25,917	27.3	525	-				xxxxxxx
	Axles	5	44	425,900	9,221	8.7	802	-				xxxxxxx
	Track spikes	11	45	302,350	21,690	28.7	496	-				xxxxxxx
	All other	3	46	8,550	2,159	101.0	27	-				xxxxxxx
	TOTAL STEEL PRODUCTS	134	47	xxxxxxx	7,118,981	xxx	361,181	691,310		xxx		
	Estimated total steel finishing capacity based on a yield from ingots of 70.0%	-	48	47,975,000	xxxxxxx	53.6	xxxxx	xxxxxxx	xxxxxxx		xxxxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	28	49	xxxxxxx	892,540	xxx	7,765	184,391		xxx		
	Ingot moulds	4	50	xxxxxxx	67,467	xxx	-	-		xxx		xxxxxxx
Iron Products	Bars	9	51	147,200	6,875	18.7	29	434				
	Pipe and tubes	3	52	97,730	9,047	37.0	132	-				xxxxxxx
	All other	2	53	63,560	2,621	16.5	488	955				
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	250,530	18,543	29.6	649	1,389				

Total number of companies included - 155

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current quarter 6,427,671 G.T.; 53.6 % of Finishing Capacity.
To date _____ G.T.; _____ % of Finishing Capacity.
The above tonnages represent 70.0 % of the ingots produced by companies whose products are included above.

The Anglia Society of Ploesti, Romania

The growth of this great company is due almost wholly to the energy and foresight of Mr. Percy Clark, present Managing Director. Our compliments to him — The Editor.

THE Anglia Society, manufacturers of wire ropes and hemp ropes was established in 1925 by its present enterprising and energetic managing director Percy R. Clark. The Society, originally capitalized at 5,000,000 lei now has a capital of 28,520,000. The plant is located on the main route between the town of Ploesti and the oil fields, and comprises the factory, offices, workmen's dwellings, warehouses, and recreation grounds totalling 35,000 square meters in extent.

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AIMING to meet demands of the Rumanian market, particularly those of its oil industry, the society started modestly with the following equipment: seven winders, one seven-wire strander, three twelve-wire stranders, two closers, one shear, and the usual testing machines, one each for tensile, torsion, and bend tests. A 112 H. P. Campbell type Diesel engine was installed, and electric equipment.

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IN 1929 the Society put in machines for making the larger ropes used in mining, and equipment for tarring textile ropes. At that time the output reached 115 carloads annually. Machinery for manila rope was also installed at that time.

✦ ✦ ✦

IN 1930 the depression halted expansion, and no further progress was initiated until 1932. At present the plant comprises the following items: 18 winders for wire and one for manila fibre, six stranders for wire and one for fibres, two closers, one tandem strander for locked strand, two heavy closers for wire rope, one machine for pre-forming strand, one shear, equipment for tarring fibre ropes, and a testing laboratory. All machines are motor drawn.

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THE Society has lately begun the manufacture of locked strand, and established an Aerial Tramway Division under the supervision of Mr. Szomto, which has done very well, installing, among many others, the Dambovita tramway in Fieni. All the ropes in these jobs, the track cables as well as the haulage cables, are the product of the S. A. R. Anglia Ploesti. Mr. Percy Clark the managing director, as well as all the company's engineers, maintain a close contact with their product in service, which enables them to supply always the latest and most approved design and highest quality. Some of their constructions are covered by patents.

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THE plant is equipped with the most modern machinery and has a capacity of 6000 tons annually, which is ample for the country's needs, but it has, nevertheless, made a recent addition (1938) of a machine for pre-forming strand, which permits the production of a perfect locked-strand cable. Air conditioning of the factory has also been undertaken recently.

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AGLANCE at the Society's progress charts shows that at the time of the establishing of the business in 1927 there were 60 workmen and an office force of 14. As demand steadily mounted, these figures rose to 108 and 17, respectively. At present, together with its affiliate the "Clark" Society, the employment figures stand at 116 workmen and 41 on the staff, including 4 travelling salesmen. The peak of production reached in 1929 was not again reached until 1937. Taxes assessed against the Society have risen (1938) to 15,000,000 lei.

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THE Society maintains an athletic field for football and gymnastic exercises, a swimming pool, and a complete outfit of football equipment and uniforms, and its team plays under the name "Anglico". A school with a three year course of study is maintained, where workmen may learn to read and write, and acquire the technical elements of their trade. Classes in English and German are conducted for the office force, and Mr. Clark arranges further studies and conferences among the executives.

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ONE sign of the Society's interest in its employees is the modern dwelling houses built for a large number of the workmen. Free bus tickets are supplied the children so they may make the round trip from the colony to the neighboring town of Ploesti to attend school. Mr. Clark's interest is seen in every detail of community life. Upon the occasion of marriage, or the birth of a child, an employee is given a bonus of a month's pay.

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ANOTHER enterprise, the **"Clark" Society,** is affiliated with Anglia. This concern manufactures leather belting, the "Titan" brand, as well as chrome tanned belts and other articles, and also conducts a brass foundry. This

(Please turn to Page 400)

Outstanding Personalities of the Wire Industry

Dr. Zay Jeffries

DR. ZAY JEFFRIES, eminent metallurgist, has been elected to membership in the National Academy of Sciences. Membership in the academy is limited to 350 members, and is recognized as the highest scientific rank an American can receive. The Academy compares with the Royal Society of Great Britain and the French Academy.

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THE election was announced at a luncheon in the Union Club in Cleveland on May 12. In congratulating Dr. Jeffries, the president of Case Institute, Dr. William E. Wickenden said:

"You are inheriting the place of two world figures. As a Clevelander you are succeeding Ambrose Swasey, eminent industrialist, patron of science and doer of good works; as a scientist you are succeeding Albert Sauveur, preeminent in the art of metallography."

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DR. JEFFRIES has contributed numerous important developments in the science of metals as a result of his research with tungsten lamp filaments, high strength aluminum alloys, and the application of X-Ray analysis to metallurgy. During the period from 1932 to 1936, Dr. Jeffries was president of Carboloy Company, Inc.

✦ ✦ ✦

Frank W. Tufts

FRANK W. TUFTS, Advertising and Sales Promotion Manager of the Continental Steel Corporation, died suddenly at his home in Kokomo, Indiana, May 24th. He was 48 years old. Death was caused by a heart condition resulting from an emergency operation for appendicitis.

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MR. TUFTS was well known in Wisconsin where he spent many years in newspaper and advertising work in Milwaukee and Madison. He travelled extensively, both in this country and abroad, and was considered to have a wide knowledge of literature and art. His geniality, constant good humor and ready wit made him many friends.

MR. TUFTS joined the Continental Steel Corporation in 1936 and while with this concern became well acquainted in the hardware and farm trade. He was formerly associated with a Chicago advertising agency and had had extensive advertising experience with the Detroit Steel Products Co. He also served in sales and advertising for the General Motors Corporation in New Zealand and other foreign countries. Mr. Tufts will be best remembered by all who knew him for his warm and friendly ways. He is survived by his wife who at the time of his death was seriously ill. He was buried in Mt. Olivet Cemetery, Joliet, Illinois.

✦ ✦ ✦

George D. Moomaw

RUSTLESS Iron & Steel Corporation announces the appointment of **George D. Moomaw** as works manager. For the past 13 years Mr. Moomaw was associated with Crucible Steel Company in an engineering and managerial capacity. Prior to that, he was superintendent of maintenance at United Alloys Steel Company in Canton, and before then, electrical engineer with the Timken Roller Bearing Company. Mr. Moomaw is a member of The Wire Association.

✦ ✦ ✦

Dr. Samuel L. Hoyt

SAMUEL L. HOYT, one of the best known of American metallurgists, has become a member of the staff of Battelle Memorial Institute, Columbus, Ohio. Formerly director of metallurgical research with the A. O. Smith Corporation, Dr. Hoyt will act as technical advisor in the planning and conduct of metallurgical research at Battelle.

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DR. HOYT is known particularly for his leadership in the development of cemented tungsten carbides for cutting tools and for his work on temperature-resistant alloys. Another phase of his work was the selection of steels and metallurgical control of the manufacturing processes required by the various new types of casing which are used in the production of oil.

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Richard Rimbach

RICHARD RIMBACH has been appointed Technical Advisor to R. C. Enos, President of Standard Steel Spring Company, Coraopolis, Pa.

✦ ✦ ✦

MR. RIMBACH will work on the development and promotion of a new process for coating steel with a pore-free metallic coat. Mr. Rimbach was formerly Director of Research, Standard Steel Car Co., Editor of METALS AND ALLOYS and more recently Consulting Metallurgical Engineer. He has written a number of articles for the technical press, translated several books and is Supervisor of the Department of Metallurgy's Extension and Evening Courses at the Carnegie Institute of Technology.

✦ ✦ ✦

A. C. Streamer

THE appointment of **A. C. STREAMER** as General Manager of the East Pittsourgn division of the Westinghouse Electric & Mfg. Co., is announced. Mr. Streamer has been Manager of the Switchgear Division.

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MR. STREAMER came to the East Pittsburgh Works in 1907 after graduating, as an electrical engineer, from Colorado State University. After completing the apprentice engineering course, he was assigned to the switchboard engineering department. In 1931 he was made manager of the Diversified Products Department and continued in executive positions that led to his appointment as Manager of the Switchgear Division when it was formed. This division is among the major manufacturing activities at the East Pittsburgh Works.

Joseph A. DeLo

JOSEPH A. DeLO has been appointed Sales Promotion and Advertising Manager of the Continental Steel Corporation. Though only 34 years old DeLo has been with the Kokomo, Indiana steel concern since 1932. Formerly assistant advertising manager, he was especially active in developing dealers and in sales promotion in the farm field. Previous to 1932, DeLo was engaged in newspaper work in Kokomo and elsewhere in the middle west as editor and advertising manager. He was graduated in 1929 from Indiana University where he majored in journalism and advertising.

JOSEPH A. DeLO
Sales Promotion Manager
Continental Steel Corp., Kokomo, Ind.

✦ ✦ ✦

Firth-Sterling Personnel Changes

FIRTH-STERLING Steel Company announces the addition of five members to its sales-engineering staff. They will make their headquarters in the Company's district offices to facilitate engineering service to users of Firth-Sterling steels and Sintered Carbides:

✦ ✦ ✦

MR. N. N. SHEPHERD, formerly with the Carboloy Company, will be a Firthite Engineer in Chicago.

✦ ✦ ✦

MR. CLIFFORD W. NITCHIE, formerly with Vascoloy-Ramet Corporation, will be a Firthaloy Die Engineer also in Chicago District.

✦ ✦ ✦

MR. LESLIE T. McKINNON, formerly with the Braeburn Steel Corporation will be a steel sales representative in Detroit.

✦ ✦ ✦

MR. GEORGE L. SHARPE, formerly with Tungsten Carbide Tool Company and Michigan Tool Company will be a Firthite Sales Representative, also in Detroit.

✦ ✦ ✦

MR. A. W. McCoy, formerly with the Carboloy Company and Union Wire Die Company will be a Firthaloy Engineer in New York in place of Mr. J. W. Mordica who is transferred to the Home Office.

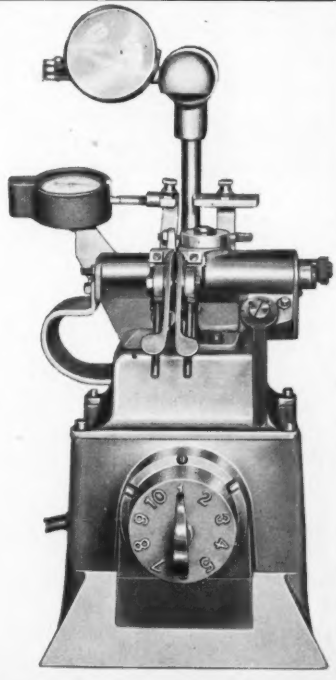
MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.

Model E-7-S Welder Capacity .010 to .062" high & low carbon wire.



MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE, CHICAGO, ILL.
Telephone, State 7468

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in April 1939 and April 1938
(In gross tons)

	APRIL 1939	MARCH 1939	APRIL 1938
Wire rods	1,791	2,654	2,829
Strip steel	4,327	4,090	3,395
Plain, black or galvanized iron or steel wire	3,728	4,927	4,054
Barbed wire and woven wire fencing	3,866	3,768	2,583
Woven wire screen cloth	164	167	99
Wire rope	511	288	359
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	629	577	414
Wire Nails	1,486	1,497	1,354
Tacks	26	21	21
Other nails, including staples	254	351	390
Bolts, machine screws, nuts, rivets and washers	722	774	671
Total, these 11 classifications	17,504	19,114	16,169

Imports of Iron and Steel Wire Into the United States
(In gross tons)

Concrete Reinforcement bars	596	183	38
Hollow bar and drill steel	75	134	76
Wire rods	638	821	271
Barbed wire	1,815	2,065	554
Round iron and steel wire	139	348	98
Telephone and telegraph wire	1		
Flat wire and strip steel	264	296	191
Wire rope and strand	296	126	185
Other wire	213	155	86
Hoops and bands	1,549	1,867	1,579
Nails, tacks and staples	1,419	779	561
Bolts, nuts and rivets	7	18	17
Total, these 12 classifications	7,012	6,792	3,656

Exports of Insulated Wire and Cable, April, 1939

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Rubber covered wire	512,541	$114,581	79,504	$ 18,593
Weatherproof wire	287,894	45,424	54,159	9,743
Other insulated copper wire	498,431	103,078	217,687	35,553
Nickel-chrome electric resistance wire	25,787	27,764	.....	.....
Total, these 4 classifications	1,424,652	$290,847	351,347	$ 62,889

Exports

ONLY 153,884 gross tons of iron and steel products (except scrap) were exported from the United States during April. Valued at $12,245,537, these shipments compare with the 162,098 tons valued at $12,569,693 dispatched in March 1939, and with the 179,297 tons valued at $12,038,117 exported in April 1938.

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Scrap Trade Lower in April

EXPORTS of scrap from the United States in April declined to 240,124 gross tons valued at $3,595,271 rom the March trade of 312,262 tons valued at $4,640,598. A year ago—in April 1938—306,900 tons of these materials valued at $4,846,323 were dispatched from this country.

Plates Retain Lead in Export Trade

ALTHOUGH non-alloy "other" plates is again the leading product exported in point of tonnage, the total for this item fell to 23,252 tons which went principally to Kwantung, 8,277 tons; the Netherlands, 5,165 tons; and Sweden, 2,334 tons. Non-alloy black steel sheets ranked second with a total of 21,568 tons, with 4,795 tons being shipped to U. S. S. R., 2,660 tons to Canada, 2,441 tons to Brazil, 2,129 tons to Mexico, 1,669 tons to France, and 1,544 tons to the United Kingdom. Tin plate—the 16,740-ton total but 5 tons greater than in March—again went to widely separated markets with Brazil receiving 3,478 tons; the Netherlands, 2,312 tons; Canada, 1,693 tons; Union of South Africa, 1,077 tons; Philippine Islands, 1,069 tons; and China, 1,050 tons.

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CANADA was again the leading market in April with purchases of 16,636 tons which included 2,660 tons of non-alloy black steel sheets, 1,930 tons of plain structural shapes, 1,693 tons of tin plate, and 1,653 tons of non-alloy hot-rolled strip steel. Brazil ranked second with a total of 12,966 tons, of which tin plate, 3,478 tons; heavy rails, 2,460 tons; and non-alloy black steel sheets, 2,441 tons, were the main items. The third market for April was the Philippine Islands which purchased 10,638 tons comprised mainly of galvanized steel sheets, 2,394 tons; concrete reinforcement bars, 1,727 tons; and tin plate, 1,069 tons. Venezuela, with a 9,728-ton trade, bought mostly seamless casing and oil-line pipe, 2,687 tons; cast-iron pressure pipe and fittings, 1,962 tons; and fabricated structural shapes, 1,436 tons. In the 9,569-ton trade with the Netherlands non-alloy "other" plates at 5,165 tons and tin plate at 2,312 tons were the chief items, while the bulk of the 9,306 ton trade with Japan was made up of 3,995 tons of non-alloy ingots, 1,641 tons of non-alloy "other" steel bars, and 1,590 tons of alloy ingots.

✦ ✦ ✦

IN April the scrap exports fell to 240,124 tons valued at $3,595,271 from the March total of 312,262 tons valued at $4,640,598. This trade in April 1938 was 309,952 tons valued at $4,846,323.

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THE exports of scrap in April included 237,691 tons ($3,487,677) of iron and steel scrap, 762 tons ($12,798) of tin plate scrap, 636 tons ($31,111) of tin plate circles, cobbles, etc., and 1,035 tons ($63,685) of waste-waste tin plate. Japan was the leading purchaser of scrap, receiving 135,659 tons, while 55,739 tons went to Italy, 10,736 tons to the United Kingdom, 7,199 tons to the Union of South Africa, and 6,734 tons to Canada.

Imports

IMPORTS of iron and steel products into the United States in April totaled 41,314 gross tons valued at $2,703,290. These figures compare with the 24,589 tons valued at $1,478,663 imported in March, and the 21,225 tons valued at $1,140,875 which were imported in April 1938.

✦ ✦ ✦

April Imports Rise Sharply

APRIL imports of 41,314 tons valued at $2,703,290 nearly doubled the 24,589-ton ($1,478,663) trade of March. By far the leading product imported was "other" pipe with 14,369 tons of the greatly increased total of 14,467 tons coming from Germany. Structural shapes in the amount of 5,873 tons ranked next with Belgium sending 3,950 tons and France 1,771 tons. British India with her 3,234 tons of pig iron supplied practically all of the April imports of that product.

✦ ✦ ✦

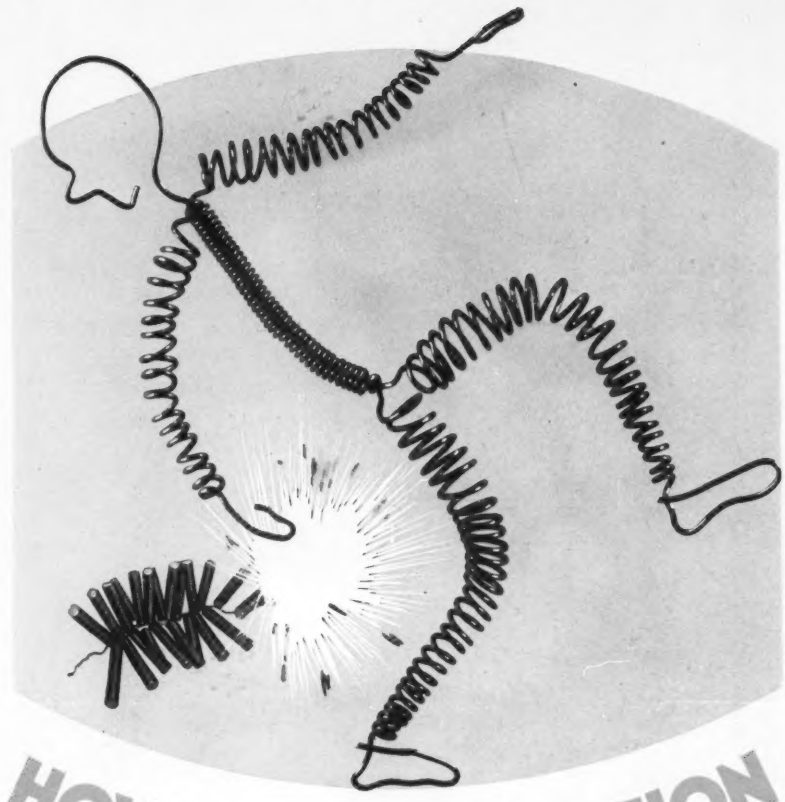
GERMANY was the chief source of imports in April—her 20,191 tons including 14,369 tons of "other" pipe, 1,435 tons of barbed wire, 1,138 tons of welded pipe, and 1,063 tons of nails, tacks, and staples. Belgium was next with 7,945 tons, including 3,950 tons of structural shapes, 1,073 tons of "other hoops and bands", and 962 tons of "bars, whether solid or hollow". The principal products from Canada were spiegeleisen (1,776 tons) and rails and track material (1,322 tons); while 3,234 tons of pig iron was the sole product imported from British India.

✦ ✦ ✦

Wood Screws

EXPORTS of iron and steel wood screws during April, 1939, totaled 9,983 gross valued at $1,887. Of this total, Ecuador took 2,650 gross valued at $361; Cuba, 2,001 gross valued at $408; Mexico, 1,171 gross valued at $186; Canada, 948 gross valued at $191; Netherlands West Indies, 840 gross valued at $186; Colombia, 423 gross

(*Please turn to Page 386*)



HOW TO GET ACTION

When you want wire to meet a specific requirement — when you want it *right* — and *right away* — call on Keystone. You'll get *action*, for although Keystone is the largest independent steel and wire mill in the country, with unsurpassed facilities for research, production and control — it's not too big to step lively. You get your samples — or your order — or your reorder with a speed and accuracy that may mean a lot to you in emergencies. Toss an inquiry our way — and watch us jump!

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HIGH CARBON or LOW CARBON

SAMSON SPRING WIRE

REG. U.S. PAT. OFF. KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Bright . . . Tinned
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Annealed
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» As Distinctive as

an American Beauty

...a Jewel by Cartier

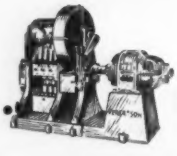
is the Performance of the

Robertson Cable

Lead Encasing Press...

the Robertson Hydro-

Pneumatic Accumulator

... 

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Hydraulic Pump. << THE DISTINGUISHING ADVANTAGES OF THESE PRODUCTS ARE FULLY DESCRIBED IN NEW BULLETINS FREE ON REQUEST. WRITE

JOHN ROBERTSON CO., INC., 125-137 WATER ST., BROOKLYN, N. Y.

Exports and Imports

(*Continued from Page 385*)

valued at $63; Finland, 384 gross valued at $151.

✦ ✦ ✦

EXPORTS of brass wood screws during the same month totaled 6,944 gross valued at $2,154. Of this total the United Kingdom took 3,130 gross valued at $296; Colombia, 722 gross valued at $388; Australia, 650 gross valued at $305; Ecuador, 650 gross valued at $221; Venezuela, 427 gross valued at $327; Cuba, 415 gross valued at $149.

✦ ✦ ✦

IMPORTS of wood screws during the same month totaled 11,500 gross valued at $348, supplied by Japan.

✦ ✦ ✦

Miscellaneous Items in the April Import Trade

CARD Clothing: 19,822 square feet, $28,438 (25,236 square feet, $38,599) all from United Kingdom, 16,940 square feet, $24,-551; Belgium, 1,580 square feet, $2,621; and Germany, 1,302 square feet, $1,266.

✦ ✦ ✦

WIRE Cloth and Screening: 52,-158 square feet (83,226 square feet) principally from Germany, 18,148 square feet; France, 13,946 square feet; Netherlands, 11,887 square feet; and Canada, 6,965 square feet.

✦ ✦ ✦

WIRE Fencing and Netting: Galvanized before weaving: None (42,482 square feet). **Galvanized after weaving:** 574,500 square feet (704,893 square feet) with Germany furnishing 322,500 square feet and Belgium sending 252,000 square feet.

✦ ✦ ✦

FOURDRINIER: 33,015 square feet (27,672 square feet) coming from Germany 27,272 square feet; France, 2,926 square feet; and Sweden, 2,817 square feet.

✦ ✦ ✦

WIRE Heddles: 1,728,000 pieces (621,000 pieces). 1,193,000 pieces came from Germany, 405,-000 pieces from Switzerland, and 130,000 pieces from France.

The Cost Control of Non-Productive Labor

(*Continued from Page 373*)

Idle Time

THE only item shown on the accompanying form under the heading of Non-Productive Wages which may not be self-explanatory, is that described as "Idle Time". This is connected with the ever-present possibility of breakdowns in production, which occur occasionally in every organization: in the normal way these cannot be attributed to productive employees, and therefore it would be unreasonable to expect an employee to be penalized by a reduction in earnings owing to some production hitch over which he has no control. It will be found in most organizations today that in anticipation of such a possibility the policy is adopted of paying all employees, who, through no fault of their own, have to stand idle for any period of time, their flat basic hourly rate, such payments being classified as Non-productive Wages and shown on the report under the heading of "Idle Time".

✦ ✦ ✦

The Standard Allowance

IT is realized that the Standard Allowance will vary to a great extent in different departments of a Wire and Wire Products factory, actual performance and personal experience being the guiding factors. Once a form of control is established, as that described here, at the end of each year it is possible to adopt the total percentage for the preceding year as the basis for the Standard Allowance for the following year. This basis should be calculated more accurately as each year passes.

This is an invitation for you to become a member of The Wire Association. ✦ ✦ ✦ ✦ ✦ ✦

The Annual Dues are $10.00

For Details Address

Richard E. Brown, Secretary

The Wire Association

300 Main St., Stamford, Conn.

Stamford Trust Co. Bldg.

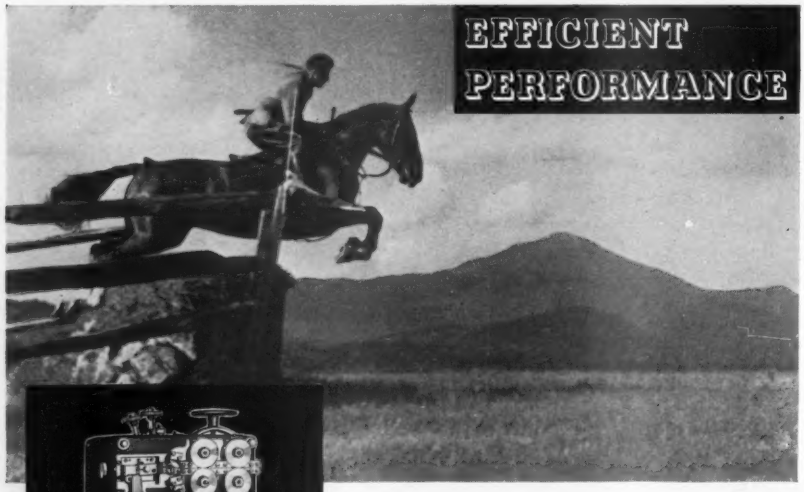
KONIK
MFD. UNDER U. S. PATENT NO. 1874814
CONTINENTAL
MANUFACTURER'S WIRE
Continental is prepared to meet the specifications of manufacturers for many special kinds low carbon wire shapes and analyses. Besides special-analysis and copper-bearing steel wire Continental — and only Continental — offers wire of Konik, the patented new steel containing copper, nickel and chromium.
Among the finishes offered by Continental are bright, bright and black annealed; sull-coated; processed; galvanized, including Flame-Sealed; liquored, coppered and tinned in many modifications. Eight shapes are standard and many specials available. Regular gauges run from No. 34 to 5/8 inch. Furnished in coils of suitable sizes, or cut and straightened to specification.
CONTINENTAL STEEL CORP.
General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis

CONTINENTAL
STEEL SHEETS AND WIRE PRODUCTS
Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed
Wire Rods, Nails, Staples, Bale Ties, Barbed Wire; Fence, 15 Types; Gates and Fittings
Sheets: Black, Galvanized, Special Coated; Roofing and Siding 14 Styles
*Trade Mark Registered, U. S. Patent Office

G. Cook Kimball

Executive Vice President, United States Steel Corp. of Delaware

MR. KIMBALL is well known in Chicago where for many years as an official of the Illinois Steel Company and the Carnegie-Illinois Steel Corporation, United States Steel subsidiaries, he has mantained his executive offices and where, for the past four years, he has been executive vice-president of the Carnegie-Illinois Steel corporation. He has been connected with United States Steel subsidiaries since 1901, beginning in the engineering department of the American Tin Plate company a year after his graduation from Harvard University. From 1905 to 1931 he served as chief engineer of the American Sheet and Tin Plate company and in 1931 was elected vice-president and a director of the company. Mr. Kimball is a director of Carnegie-Illinois Steel corporation, president of Illinois Steel company, president of Gary Land company, and a director of Illinois Manufacturers association. He is a member of the American Iron and Steel institute and the Harvard Engineering society.



MORE PROFITABLE spring production IS possible with smooth-running, efficient, completely modern spring winding equipment. That is the experience of the important group of manufacturers* using TORRINTON Spring Making Machinery. You will want to know more about these high-speed, accurate, ruggedly-built machines and the opportunities for profit which they present. Get all the facts today.

Spring Making Machines by

*Names on request.

TORRINGTON

THE TORRINGTON MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT . . . U. S. A.

Bethlehem Installs New Cleaning And Baking Unit

(*Continued from Page 377*)

rod and may be varied to suit any condition.

✦ ✦ ✦

ALL operations are under the control of the crane operator. As he passes along the line, the same foot button progressively activates the different pieces of equipment, thus simplifying the manipulations.

✦ ✦ ✦

VENTILATING hoods are provided both over the acid tanks and over the lime tanks. The former are connected to an ejector stack, while the hoods over the lime tanks are connected to a suction fan.

✦ ✦ ✦

THE construction of the basement permits ready inspection of every part, with easy access to all tanks for the repair of leaks.

✦ ✦ ✦

THE following instruments are assembled on a centrally located board:

a) **Six potentiometers, one for each set of five burners on all flash bakers. These automatically regulate the input of the mixed gas and maintain the proper air-fuel ratio, as set by manual control.**

b) **One recording gas flow meter for all three bakers.**

c) **A potentiometer with dual control, for automatic recording and regulation of the acid temperature in the pickling tanks.**

d) **A gage for measuring the pressure of the 10-lb. air used in the automatic regulators.**

e) **A gage for measuring the gas pressure.**

✦ ✦ ✦

Wire One Six-Hundredth of an Inch in Thickness

THE world's smallest electric motor on view at the Italian Pavilion is about twice the size of a pinhead. Visitors must use microscopes to inspect it. It is capable of turning 25,000 revolutions per minute. Its axle is set in a ruby bearing. Seventy inches of wire one-six-hundredth of an inch thick are wound around the armature. It also contains parts of gold, platinum, nickel, copper, iron, steel and ivory.

'Round the World With the Wire Industry

Belgian Wire, Nail and Bolt Manufacturers Request Government Protection

THE Union des Trefileries et des Clouteries Belges and the Comptoir des Boulonneries Belges have asked the Belgian Government to approve and enforce regulations covering the production of their respective products (wire and nails in the first instance and bolts in the second) under the terms of the Royal Decree of January 13, 1935. The first-named group comprises thirteen firms and is a member of the Syndicat General d'Exportation des Produits Trefiles (IWECO). In their petition to the Government, the Union points out that in recent months their production has amounted to only 38.4 percent of their capacity (which is estimated at 450,000 tons annually). It is also pointed out that countries which formerly purchased Belgian nails and wire have now started production and that other producing countries have increased their capacity and/or have established prohibitive duties. Prior to petitioning the Government, the Union Membership agreed not to increase their production capacity before December 31, 1941, and to limit production to 60 percent of their present capacity during that period. The Government was asked to make this agreement binding on all producers and distributors.

✦ ✦ ✦

THE comptoir des Boulonneries Belges adopted similar regulations on December 2, 1938, and have requested their extension to all producers. They would agree to limit production to 50 percent of capacity until December 31, 1940, and have prohibited the increase or renewal of machinery or the building of new plants during that same period. They point out that during 1937 their output amounted to only 31.3 percent of their capacity and that during 1938 sales were very depressed and production dropped to only 21 percent of capacity. American, Italian and French competition was stated to be acutely felt.

✦ ✦ ✦

Sheffield Reports New Steel

ACCORDING to an item which appeared in the March 6, 1939, issue of The Star, Sheffield, the Firth Vickers Stainless Steel, Ltd., Staybrite Works, Sheffield, 9, have developed a new steel which remains strong at high temperatures and which resists scaling when heated even red hot. Further details of the composition of the steel were not disclosed, it was stated, in view of the defense program. (American Consulate, Sheffield).

(*Please turn to Page 390*)

Reliability

When you select a source of supply for your manufacturers' wire, you insit on RELIABILITY.

For efficient production, your wire must be the right grade and possess the correct characteristics for the particular job it has to do. But this alone is not enough—these qualities must be UNIFORM.

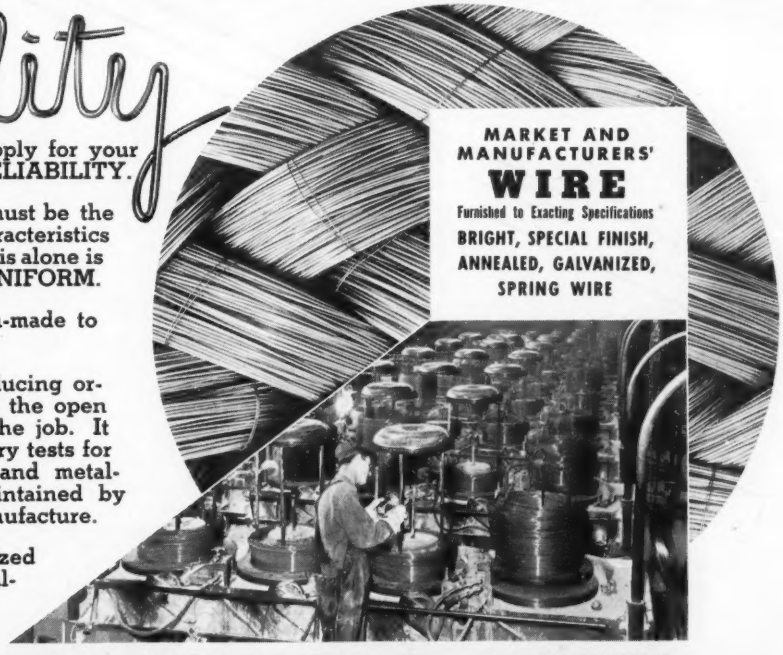
Sheffield manufacturers' wire is custom-made to your exacting requirements.

Sheffield is a self-contained steel producing organization. Controlled quality starts in the open hearth furnaces. The steel is fitted to the job. It must pass Sheffield's exacting laboratory tests for chemical, physical, metallographical and metallurgical analyses. Uniformity is maintained by rigid inspection of every step in its manufacture.

Many manufacturers have standardized on Sheffield wire because its high quality and uniformity permit speedy, uninterrupted production.

You, too, will find Sheffield a reliable source of supply for *your* requirements.

Address Your Inquiries to Dept. W-4



SHEFFIELD STEEL CORPORATION
KANSAS CITY MISSOURI

INGOTS - BLOOMS - BILLETS - SHEET BARS - WELDED WIRE MESH - STRAND - WIRE RODS - PLATES - HOT ROLLED & GALVANIZED SHEETS - WIRE PRODUCTS - FENCE - RIVETS - MERCHANT BARS - SMALL SHAPES - TRACK SPIKES - TIE PLATES - RAIL STEEL & NEW BILLET REINFORCING BARS - FORGINGS - GRINDING MEDIA - BOLT & NUT PRODUCTS

'Round the World With the Wire Industry

(*Continued from Page 389*)

One Strand Barbed Wire

ONE strand barbed wire is still in demand in some Latin American markets, but in Europe it is only demanded by Switzerland and, in very small quantities also in the Lithuanian and Esthonian markets. The expectations that it would be possible to raise export figures on these wire products have not come true.

✦ ✦ ✦

Belgian Makers Seek Output Control of Wood Screws

THE Union des Fabricants Belges de Vis-a-Bois, Woluwe-Saint-Pierre, near Brussels, is seeking Government approval to a program by which members would limit the output of wood screws. Members of this organization have voluntarily agreed to limit production for a period ending December 31, 1940, to 60 percent of capacity of all factories in working order as of January 1, 1939, and have also agreed that they would install no new or supplementary plant equipment apart from necessary replacements.

✦ ✦ ✦

Cartels Maintain Prices

MEETING in Luxemburg on March 8th and 9th, the International Steel Cartel is reported to have decided to maintain steel prices unchanged until its next meeting (to be held in Liege in July). The quarterly meeting of the IRMA (International Rail Cartel) was held at the same time, during which meeting a survey of rail markets was made and the decision reached not to modify any current prices. (Office of American Commercial Attache, Brussels).

✦ ✦ ✦

Polish Metal Manufacturing Company Reopened

UNDER the name of Zjednoczone Zaklady Przemyslu Metalowego (United Metal Industry Enterprises) the plant of the Polish firm "Metal" S. A. at Lwow was reopened after having been inactive for several years. It is planned that the company will fabricate such products as dump-carts, rail trucks, lifts, cranes, etc. It will also manufacture barbed wire; forged, cast, and pressed screws, and bolts and rivets. About 300 workmen will be employed.

✦ ✦ ✦

German-Japanese Wire Export Agreement

THE German wire industry does not confirm the reports that an agreement is under way with Japan and concerns iron and steel wire exports, but it is probable that it will be possible to come to an agreement regarding the markets in Siam and the Dutch Indies. Such an agreement would however, be a private agreement between the continental exporters and the central wire export office in Japan and not of a uniform feature.

(*Please turn to Page 393*)

The thoroughly modern Syncro Machine Company plant at Rahway, N. J., produces a complete line of unsurpassed machinery for the wire industry. May we quote on your requirements?

SYNCRO

SYNCRO - MACHINE - COMPANY

420 Lexington Avenue, New York

Factory — Rahway, New Jersey

A Review of Recent Wire Patents

No. 2,156,652, MANUFACTURE OF WIRE STRANDS, Patented May 2, 1939 by Gavin Mure Harris, London, England, assignor to Callender's Cable and Construction Company Limited, London, England, a British company.

The method comprises assembling around an inner part of the strand, a layer formed of circular wires, of which the number and diameters are so selected that, if closely assembled while undeformed in a layer of the same shape as the exterior of the inner part, they would enclose that part with substantial clearance around it, and deforming the wires of this layer during assembly to bring the size of the layer down to cause it to fit on the inner part, the deforming being carried out in two stages, in the first of which the wires are compressed radially by being drawn through a converging annular throat between a mandrel and a die and in the second of which the wires are brought together and finally shaped in a die.

✦ ✦ ✦

No. 2,156,728, SPRING STRUCTURE, Patented May 2, 1939 by Abraham Krakauer, Brooklyn, N. Y., assignor to Kay Manufacturing Corporation, Brooklyn, N. Y., a corporation of New York.

Upholstery springs are provided for use with modern "no sag" springs, to change the level of the effective spring surface provided by the "no sag" springs, as at the front portion of a seat.

✦ ✦ ✦

No. 2,157,958, INDEXING MECHANISM FOR AUTOMATIC SCREW MACHINES, Patented May 9, 1939 by Alfred F. Jelinck and Walter E. Gross, Cleveland, Ohio, assignors to The Cleveland Automatic Machine Company, Cleveland, Ohio, a corporation of Ohio.

Tool turret indexing mechanism is provided, in which the rotative movement of the turret is effected through a gear controlled by the reciprocative drive mechanism for the turret and organized therewith to prevent undue wear or misalignment of the parts of the assembly.

✦ ✦ ✦

No. 2,158,038, WIRE DRAWING, Patented May 9, 1939 by David S. Starring, Greens Farms, and George B. Horn, Fairfield, Conn., assignors to Wheeler Insulated Wire Company, Bridgeport, Conn., a corporation of Connecticut.

The invention relates particularly to handling the wire as it leaves the last die of the wire-drawing apparatus, and the inventors provide a collecting spool upon which the drawn wire is wound, and this spool functions in place of the conventional capstan, but without slippage, it is stated.

✦ ✦ ✦

No. 2,158,281, FIREPROOF CABLE COMPOUND, Patented May 16, 1939 by James G. Ford, Forest Hills, and Charles F. Hill, Edgewood, Pa., assignors to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania.

In this compound, there is included chlorinated naphthalene containing 50% to 65% chlorine and a chlorinated diphenyl compound containing 50% to 65% chlorine in admixture with a lesser quantity of polymerized styrene one of tricresyl phosphate and heavy coal tar distillate, and a rubber resin from the group consisting of chlorinated rubber, the reaction product between rubber and stannic chloride, ferric chloride, or chlorstannic acid and gutta percha, the chlorine content being not less than 50% by weight, the compound being plastic within the range from about -20° C. to about 100° C. so that in a cable impregnated therewith the compound remains sufficiently flexible at the lower temperature to be bent without injury and sufficiently plastic at the higher temperature as not to run out of the cable.

✦ ✦ ✦

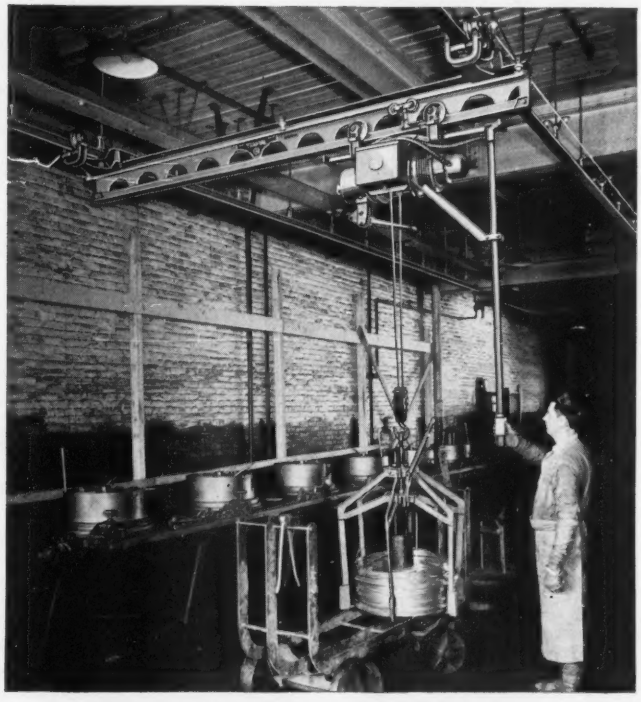
No. 2,158,390, OPEN MESH FABRIC, Patented May 16, 1939 by Herbert E. White, San Francisco, Calif., assignor to The E. H. Edwards Company, a corporation of California.

An open mesh wire fabric is produced without a weaving operation, although some of the strands pass under and over adjacent strands.

(Please turn to Page 392)

CLEVELAND TRAMRAIL

OVER HEAD HANDLING EQUIPMENT



Self centering external block stripper

For stripping draw blocks which cannot be slotted for internal type stripper

A Cleveland Tramrail Product

ALSO BUILDERS OF CLEVELAND CRANES ALL WELDED

CLEVELAND TRAMRAIL

DIVISION OF THE CLEVELAND CRANE & ENGINEERING CO.

1141 Depot St.

WICKLIFFE, OHIO.

Or Consult Your Phone Directory under Cleveland Tramrail

A Review of Recent Wire Patents

(Continued from Page 391)

No. 2,158,647, SPRING SEAT CONSTRUCTION, Patented May 16, 1939 by Harold F. Wolfe, Detroit, Mich., assignor to The Murray Corporation of America, Detroit, Mich., a corporation of Delaware.

A resilient wire support is provided between the wire base frame and the cushion, which support is connected to the cushion so as not to affect the spring characteristics of the cushion as a whole.

✦ ✦ ✦

No. 2,159,742, GAS PRESSURE ELECTRIC CABLE, Patented May 23, 1939 by Ernst Kirch, Berlin-Niederschoneweide, Germany, assignor to General Electric Company, a corporation of New York.

The dividing layer or sheathing is dispensed with, and the normal gas pressure is reduced. Migration of the impregnating material is lessened by the use of films of insulating material interspaced between layers of the paper bands, about the wire conductors, in overlapping relation thereto.

✦ ✦ ✦

No. 2,159,866, BOLT AND LIKE EXTERNALLY SCREW - THREADED MEMBERS, Patented May 23, 1939 by Oliver Edwin Simmonds, London, England, assignors to Simmonds Development Corporation Limited, London, England.

This inventor provides a self-locking bolt, having a recess in its shank and extending nearly around the same, housing an elastic insert which is penetrated by the threads of a nut screwed thereon.

✦ ✦ ✦

No. 2,160,020, WIRE BENDING MACHINE, Patented May 30, 1939 by Frank J. Horton, Detroit, Mich., assignor to No Sag Spring Company, Detroit, Mich., a corporation of Michigan.

Spring-forming apparatus is provided, which bends wire into sinuous form, cuts the wire, shapes the ends into desired shapes and stresses the spring to provide a set on an arc of determined radius.

✦ ✦ ✦

Research in Steel Technology Transferred to the Steel Institute

RESEARCH in steel technology formerly conducted by The Association of American Steel Manufacturers Technical Committees, with headquarters at Pittsburgh, is being transferred to the Technical Committees of American Iron and Steel Institute, effective June 1, 1939. Announcement of the transfer was made jointly by American Iron and Steel Institute and The Association of American Steel Manufacturers Technical Committees. The offices of the latter association which was established some 40 years ago, were closed on June 1, 1939.

✦ ✦ ✦

THE standards for chemical compositions, physical properties, rolling tolerances and other permissible variations from specified dimensions originally promulgated by The Association of American Steel Manufacturers Technical Committees will hereafter be sponsored by American Iron and Steel Institute, and will be published as a part of its "Steel Products Manual."

This is an invitation for you to become a member of The Wire Association. ✦ ✦ ✦ ✦ ✦ ✦

The Annual Dues are $10.00

For Details Address

Richard E. Brown, Secretary

The Wire Association

Stamford Trust Co. Bldg.,

300 Main St., Stamford, Conn.

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

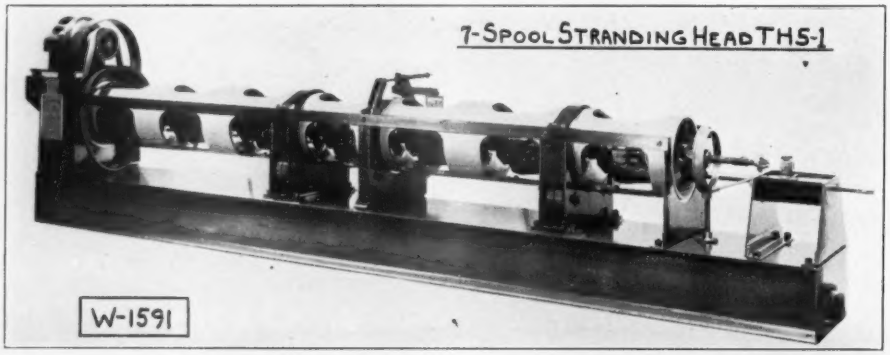
PATERSON, NEW JERSEY, U. S. A.

TUBULAR STRANDING MACHINES

Standard Sizes For From 5 to 100 Pound Spools

Silent Support Rolls—All Steel Rotor—Vee Belt Drive—Electric Stops

7 Second Brakes



ELECTRICAL WIRE, CABLE & WIRE ROPE MACHINERY

Printed Literature Available On Considerable Of The Equipment Used In These Fields—Inquiries Are Invited

'Round the World With the Wire Industry

(*Continued from Page 390*)

"Iscor" Has Record Year

"ISCOR", the popular name for the South African Iron and Steel Industrial Corporation, had a record year in the period ending June 30, 1938, and reported a manufacturing profit of £1,236,122, or double that of the preceding year. Only limited coke production kept down the plant's activities, with pig iron output increasing from 90,000 tons in the year ending June 30, 1937, to 335,536 tons during this subject year. Higher steel prices, increased demand and output, lower unit cost of production, and the imposition of dumping duty on American steel, all combined to make possible the gains noted.

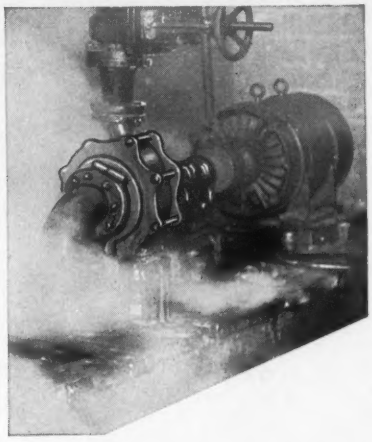
✦ ✦ ✦

Recovery of Galvanized Scrap in Japan

A CLIPPING from the Osaka Mainichi & Tokyo Nichi Nichi, supplied by the office of the American Commercial Attache at Tokyo, reports the discovery by Professor Kiyoshi Takahashi of the Department of technology at Osaka Imperial University of a method for separating on a commercial basis zinc and steel comprising discarded galvanized sheets. The process is briefly described as involving the vaporizing of the zinc plating of a galvanized sheet by heating that sheet to a temperature of 500°C., with the result that it is possible to reclaim the zinc and the iron (steel) separately. This process is considered extremely valuable by Japan since it is in the midst of a scrap reclamation movement. Professor Takahashi is also reported to have devised a means of electric plating black sheets with aluminum which it is claimed produces a more satisfactory coating than that accomplished by galvanizing. This electric plating method is described as consisting in segregating aluminum from clay and applying it to black sheets which, when finished, are much more dur-

(*Please turn to Page 394*)

Look at this
Durichlor Pump saving money by the gallons!



And not only this one Durichlor pump but also the mate to it, each of them handling 350 g.p.m. of muriatic pickle liquor. Two other Durichlor pumps, of a larger size, are each handling 500 g.p.m. of the waste pickle liquor.

They save money by the gallons because they are efficient and not affected by corrosion —Durichlor is highly resistant to muriatic acid in all concentrations and at all temperatures.

Durichlor (and Duriron) centrifugal pumps for use with corrosive liquors are available in sizes from 1" suction, 1" discharge to 10" suction, 8" discharge. Technical bulletins on any of them will be sent you on request.

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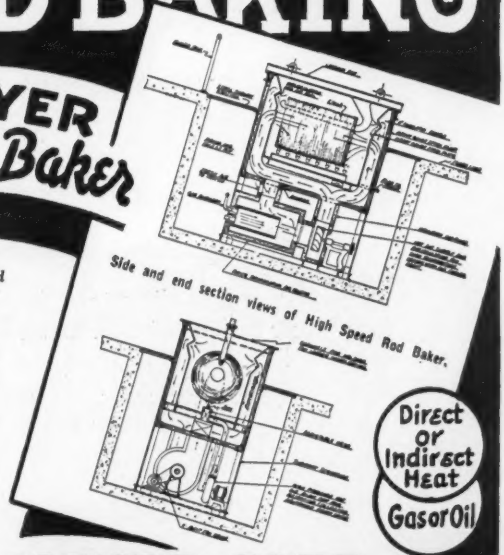
438 N. Findlay St. Dayton, Ohio

It will "show you something"
in ROD BAKING
CARL-MAYER "Hi-Speed" Rod Baker

Patents Allowed and Patents Pending



It is backed by 20 years' experience and a reputation for advanced engineering and dependability in industrial oven construction . . . Write for literature today.

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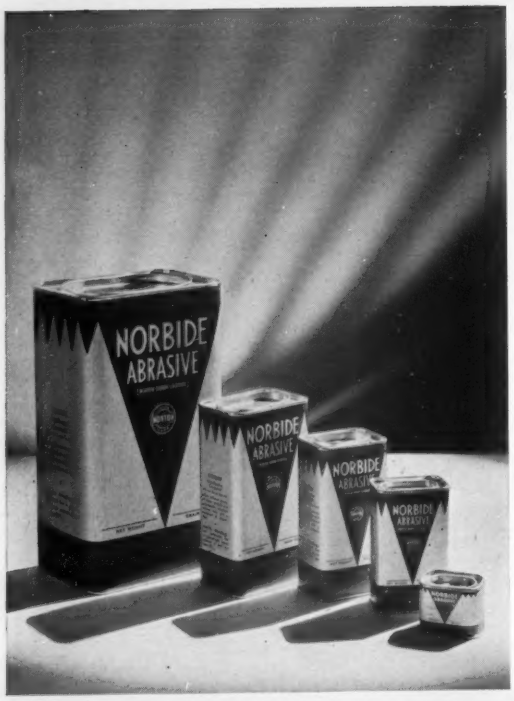
ROD BAKERS - OVENS - AIR DRAW FURNACES
3030 EUCLID AVENUE ◇ CLEVELAND, OHIO



NORBIDE ABRASIVE

For Cemented Carbide Dies

Used in place of diamond dust it reduces the cost of shaping, ripping and finishing.

NORTON COMPANY
WORCESTER, MASS.

N—38

NORTON ABRASIVES

Bell-Mine Pulverized
LIME

WARNER COMPANY Lime Bell Mine Products BELLEFONTE DIVISION

FOR WIRE DRAWING

Because the pure limestone is deep mined 700 feet below surface at Bellefonte, is burned in large modern Rotary Kilns under constant engineering supervision, and the lime is check-tested by trained chemists in the Warner Laboratory at the plant

BELL-MINE LIME IS UNIFORM AND PURE

Warner Company

Bellefonte Division

Sales Offices: Pittsburgh, Philadelphia, Bellefonte, N. Y. City

'Round the World With the Wire Industry

(*Continued from Page 393*)

able than and superior in appearance to galvanized sheets.

✦ ✦ ✦

THE demand for wire products on all export markets continues to be very heavy. February-March is the usual spring business season on almost all export markets. This year, business for May was even better than in April, whereas February had been a poor month. All products are bought, even netting, which for some time has been rather neglected. From the Far Eastern markets the demand has been best since 1936. American competition is not keen at present, prices are well maintained and no concessions of any kind have been granted. The best demand is for wire nails, the second for fencing wire, barbed wire which had a good season in 1938 is not bought just now. As German exporters anticipate, business will be good next month, whereas at the end of June a decline is expected. Foreign rumours of discrepancies inside the IWECO are not correct. Whereas it is true that negotiations with Poland have not yet come to an agreement, the Polish competition is of small importance just now.

✦ ✦ ✦

IT is probable that an agreement will be signed very soon with the Spanish wire industry as concerns sale of wire in Spain and imports of rods to Spain and the export markets. The export business which Spain started only in 1932-33 was naturally interrupted in 1936. It is not possible that Spain reappears on the export market before the end of 1940 and the industry will have to import large quantities of machinery for reconstruction of the heavily damaged Spanish wire industry.

✦ ✦ ✦

THE demand for wood screws has also greatly improved, almost all export markets are buying. The German industry had to accept after July 1st the metric standards for both screws and bolts

A
WORD
TO THE
WIRE-WISE

Whatever your pickling problem may be, there is a grade of RODINE, the world-wide inhibitor, that will give you perfect pickling. Our laboratories work unceasingly in your service — and without charge.

If you have any metal-treating problem—pickling, cleaning, rust-proofing, painting—we will gladly work with you to solve it.

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Detroit, Mich. Walkerville, Ont.

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Skill and accuracy in manufacture with the use of selected stones make Balloffet Diamond Dies the choice of the most critical users.

•

Quality Diamond Dies
Since 1870

BALLOFFET
DIES AND NOZZLE CO., INC.
45-47 Adams Street
Guttenberg, New Jersey

and nuts. International standards (such as Withworth, etc.) can be used only in future for export products. Prices for screws and bolts and nuts are advancing slowly.

✦ ✦ ✦

A Further Discussion of Reactive Wire Drawing

(*Continued from Page 369*)

been set. It is evident, therefore, that any change in the value of H is actually an equal change in the value of D and the back tension is automatically regulated to exactly suit the condition of the metal passing through the die at any instant. An increase in the value of H caused by an increase in the demand of D, immediately produces a proportional increase in the value of R, which in turn produces a decrease in the new value of D, thus bringing the system back into balance but with a slightly greater value of D because, as previously shown, the back pull curve is not a straight line. The converse of the above is also true, as affecting a decrease in the value of D.

✦ ✦ ✦

THE above is evident graphically from a study of the diagram Fig. 4, if it is kept in mind that by mechanical construction any change in H produces a proportional change in R, and can perhaps be made still clearer by the following numerical example.

Assume the conventional die load to be 1000# and use 80% back pull.

Reactive die load D will equal 500% (From curve, Fig. 1) and R will equal 800#.

$H = D + R = 500\# + 800\# = 1300\#$

Assume that due to a "hard spot" in the material, or any other reason, the die pressure increases to 550#. This is equivalent to a conventional die pressure of 1050#, because the additional 50# pressure has come on the die after the machine was set at 80% back pull and placed in operation.

Therefore, as before:
$D = 525\#$
$R = 840\#$
$H = 1365\#$

Conversely, should the die pressure drop 50#, or to 450#, the following values would obtain:
$D = 475\# = (1000\# + 50\#)/2$
$R = 760\# = (80\%$ of $950\#)$
$H = 1235\#$

✦ ✦ ✦

ANY further discussion, criticism or interrogation will be appreciated.

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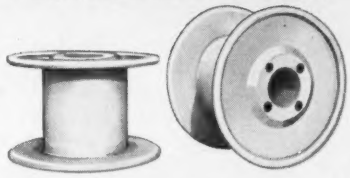

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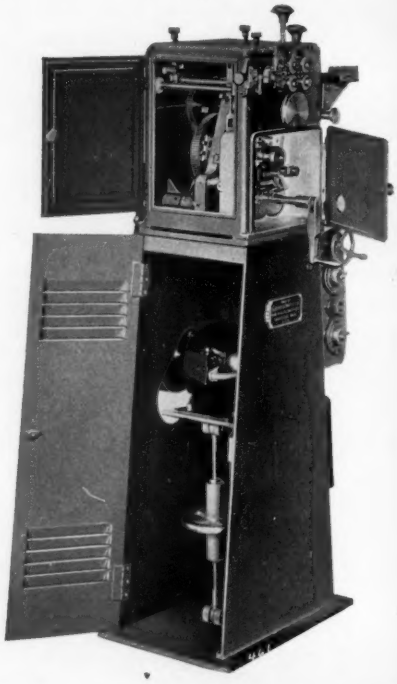
✦ ✦ ✦

THIS machine, with standard equipment, will Coil and Cut all kinds of compression and extension springs from all size wire from .004" up to .028" diameter. Inside diameter of springs 1/32" to 11/32".

✦ ✦ ✦



THE wire feed may be increased from 24" up to 36" on sizes up to .02" through adaptation of special auxiliary gearing usable only with Variable Speed Transmission Drive.

✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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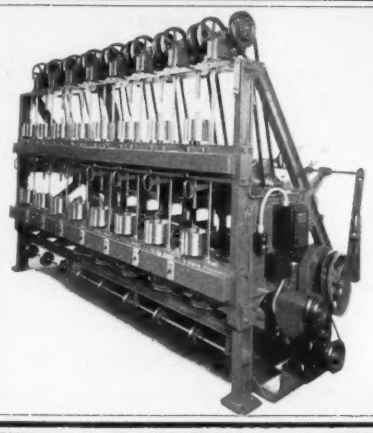

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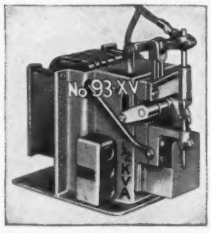

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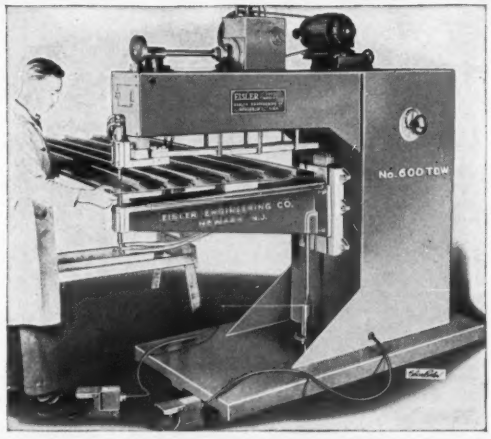

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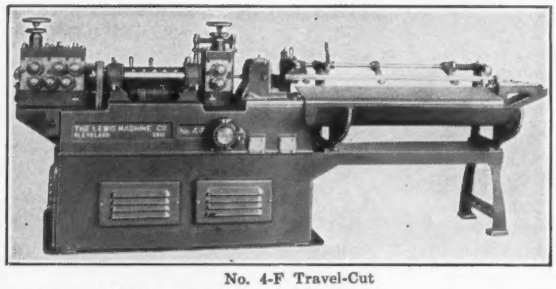

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(*Continued from Page 371*)

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✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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✦ ✦ ✦

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piston connects to the left hand set of shifting levers while the cylinder connects to the right hand set, the combination of which, together with motor and oil pump, offers the source of power for speed regulation. The valve directs flow of oil to either right or left hand side of the piston, thus operating it in either direction to increase or decrease Transmission speeds.

✦ ✦ ✦

EQUALIZING links interposed between the two pairs of shifting levers insure equal movement on both pairs and maintain perfect alignment of the Transmission V-belt in the discs.

✦ ✦ ✦

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✦ ✦ ✦

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(*Continued from Page 381*)

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American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

COILERS AND SPOOLERS FOR INSULATED WIRES—
Entwistle, James L., Pawtucket, R. I.

COPHOLDERS—Steel
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIAMOND POWDERS—
Smit, J. K. & Sons Inc., New York, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIES—Diamond
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Co., New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Inc., Irvington, N. J.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Co., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Inc., Irvington, N. J.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES—
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O

DRUMS—Flange Steel
Stevens Metal Products Co., Niles, O.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

ENGINEERS—Consulting Wire Mill
Hartley, George D., Worcester, Mass.
Lewis, Kenneth B., New York, N. Y.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FILLERS—Paper for Cable
E. W. Twitchell, Inc., Phila., Pa.

FLASH BAKER—
Carl-Meyer Corp., The, Cleveland, O.

FURNACES—Annealing
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Automatic
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Galvanizing
Lee Wilson Engineering Co., Cleveland, O.

FURNACES—Hardening and Tempering
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

GALVANIZING EQUIPMENT
Lee Wilson Engineering Co., Cleveland, O.

GRINDERS—ROLL
Norton Co., Worcester, Mass.

HOISTS—Electric Traveling
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.

INSULATION — Cable or Cable Filler
E. W. Twitchell, Inc., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—
Warner Company, The, Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Magnus Chemical Co., Garwood, N. J.
Vanco, Co., The, Manchester, Conn.

LUBRICANTS—Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller, R. H. Co., Homer, N. Y.
Vanco, Co., The, Manchester, Conn.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Coilers
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Covering Wire
Fidelity Machine Co., Philadelphia, Pa.
Sinfra Corp., The, Jersey City, N. J.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Die Making
Firth-Sterling Steel Co., McKeesport, Pa.

MACHINERY—Enameling
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Royle, John & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Forming
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Lee Wilson Engineering Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Sinfra Corp., The, Jersey City, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.
Sinfra Corp., The, Jersey City, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y. Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY — Measuring Wire & Cable
Durant Mfg. Co., Milwaukee, Wis.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works Co., Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Rubber Strip Covering
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Stranding
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Taping
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing
Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Inc., Newark, N. J.
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.

WHERE TO BUY, Continued

MACHINERY—Wire Rope
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y. Co., Phila., Pa.
Synero Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Torrington Mfg. Co., The, Torrington, Conn.

MOTORS—Electric
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

PACKING—Tannate Leather
Rhoads & Sons, J. E., Philadelphia, Pa.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PIPING AND FITTINGS—Acid Resistant
Duriron Co., Inc., The, Dayton, O.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

RECORDERS—Fault and Reel
Entwistle, James L., Pawtucket, R. I.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Synero Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products, Co., Niles, O.

REELS—Wire Drawing
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products, Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS
Carl-Mayer Corp., The, Cleveland, O.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

ROLLS—
Farrel-Birmingham Co., Ansonia, Conn.

RUST PROOF COMPOUND—
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.

SKIN PROTECTOR—
Magnus Chemical Co., Garwood, N. J.

SOAPS—Industrial and Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Homer, N. Y.
Vanco, Co., The, Manchester, Conn.

SPARK TESTING EQUIPMENT—
Entwistle, James L., Pawtucket, R. I.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Chicago, Ill.

SPOOLS—Shipping and Shop
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Chicago, Ill.

SPOOLS—Steel
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TAKE-UPS FOR CABLE, HOSE, LEAD PRESSES AND SHEET RUBBER—
Entwistle, James L., Pawtucket, R. I.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
H. J. Ruesch Machine Co., Newark, N. J.

TURKS HEAD—
Standard Machinery Co., Auburn, R. I.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y. Co., Phila., Pa.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seymour Mfg. Co., Seymour, Conn.
Sheffield Steel Corp., Kansas City, Mo.

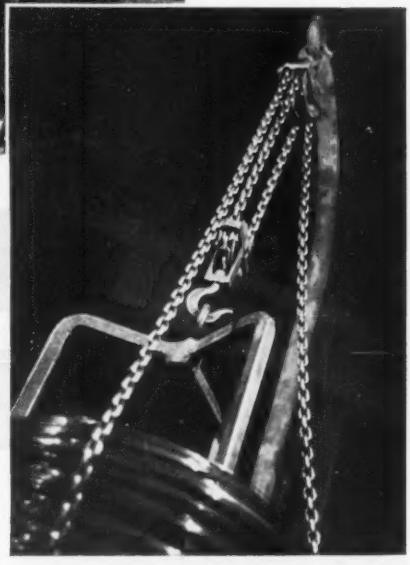
WIRE—Stainless Steel
Firth-Sterling Steel Co., McKeesport, Pa.

WIRE—Steel—Also Coppered Steel——Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Sheffield Steel Corp., Kansas City, Mo.

WIRE AND STRIP—Zinc
Metal Industry Works, Poland.
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.



THE *Sales Manager* LOOKS AT MARKETS

THE Sales Manager looks out into a brighter world of promising new markets since modern Morgan wire drawing equipment has been installed. At last he can meet vigorous competition on even terms — or better. Through ✓ increased production with ✓ lower operating and maintenance costs, he can capture ✓ profitable orders that formerly eluded him. And because Morgan machines are so carefully and accurately designed, so ✓ dependable on production of all kinds of wire, he is sure of ✓ high quality and ✓ scheduled deliveries. Today he considers markets in terms of extra profits.

Continuous Wire Drawing Machines; Take-up Frames; Horizontal Bull Blocks; Vertical Spindle Bull Blocks; Reels; Pointers; Motor Drives; Wire Mill Accessories.

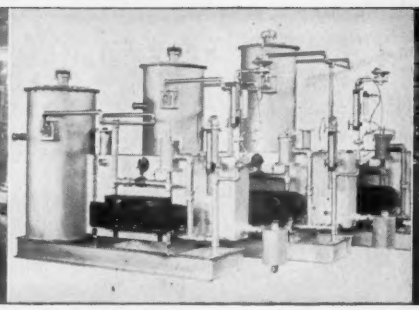
MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U. S. A.
Sole European Representatives:
MALMEDIE & CO., Dusseldorf, Germany

W-39

MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS

MORGAN *Wire Drawing Machinery*

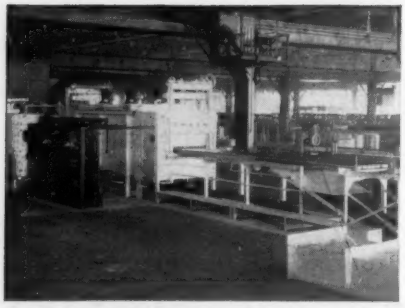
Coiled strip as well as brass, copper, bronze and nickel-silver wire in large coils is bright annealed in this continuous special atmosphere E. F. furnace.



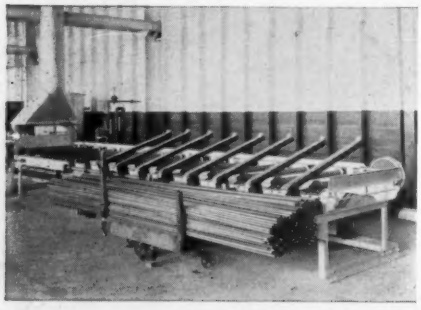
3 standard sizes of Elfurno generators for producing the inexpensive protective atmospheres used in controlled atmosphere furnaces. Elfurno generators are built in sizes for producing any number of cu. ft. required.

A continuous E. F. furnace equipped with The Electric Furnace Company's new recuperative type gas fired, radiant tubes, bright annealing copper tubing in coils.

For Bright Annealing Wire,



Bright annealing copper tubing in straight lengths —various diameters and lengths are handled continuously in this E. F. special atmosphere electric furnace.



Discharge end and roll out table of another E. F. continuous controlled atmosphere furnace for bright annealing tubing. The material is automatically unloaded onto trucks.

Strip, Tubing, Etc.
. . . . Continuously

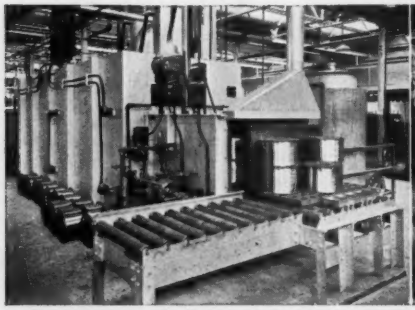
The Electric Furnace Company has made a number of outstanding electric and fuel fired, special atmosphere furnace developments and installations for bright and clean annealing steel, copper, brass, bronze and nickel silver products including strip, stampings, tubing, wire, etc. A few furnaces we have built for non-ferrous products are shown above and below.

We build continuous and batch type furnaces for handling practically every product and for any production — for annealing, normalizing, copper brazing, silver soldering, scale-free hardening, drawing, carburizing, nitriding, enameling, heating for forging and for every other industrial heating or heat treating process.

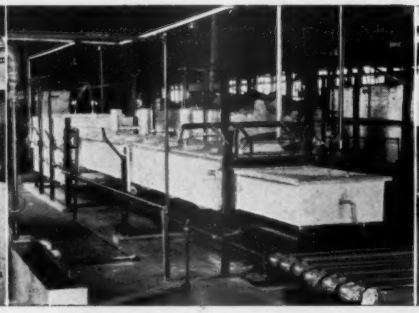
We build gas fired, oil fired, or electrically heated furnaces—whichever is best for the particular plant, process or product. Consult with us on any of your furnace or heat treating problems. No job is too large or too unusual.

The Electric Furnace Co., Salem, Ohio

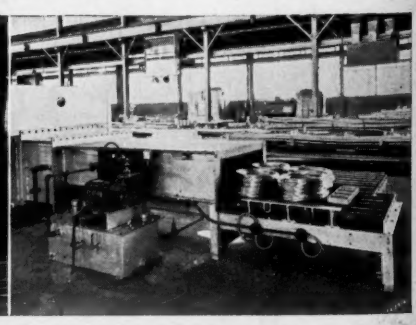
Gas Fired, Oil Fired and Electric Furnaces — For Any Process, Product or Production



Copper wire on large reels in bright annealed in this E. F. continuous furnace — capacity 36,000 lbs. per day. The wire comes out uniformly annealed, bright and dry.



Bright annealing fine copper wire on small spools. This E. F. furnace handles 10,000 lbs. per day. Any of these furnaces can be built in larger or smaller sizes.



Charging end of another E. F. continuous, controlled atmosphere electric furnace for clean annealing large coils of bronze, copper and nickel-silver wire.